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DEVELOPMENT AND IMPROVEMENT OF PORTS

The establishment of trans-shipment facilities
in developing countries

Report by the UNCTAD secretariat

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SUMMARY AND MAIN CONCLUSIONS

1. This study is focused on the container trade, a branch of shipping and port activity in which great changes have been or are being made. The big transoceanic shipping lines have taken advantage of the flexibility and scope for modulation afforded by the container technique to reorganize and restructure shipping services to regions of heavy traffic: Asia, the Middle East, Europe and North America. The traditional port-to-port routes have been replaced by veritable gridded networks assembled around trans-shipment ports: the points at which different trades intersect and interconnect. The lines have thus been able to combine trades and, by increasing the size of their ships and making full use of them, have achieved economies of scale in deep-sea hauls and reduced unit costs and transit times. By organizing - often alone, or with other shipping lines - secondary transport networks served by purpose-designed feeder ships, they have increased the number of ports served from a single port of shipment. By extending their operations upstream and downstream, they have achieved sweeping economies of scope and gained other advantages that have enabled them to offer shippers a made-to-measure service.

2. In the regions concerned, these changes have altered the traditional traits of the regular-route sector. The services rendered have been made more competitive; this has affected freight rates and the trade development of the countries concerned to the point where some of them have seen fit to review their national shipping policy, placing greater emphasis on promoting the interests of users of shipping services.

3. This study has led to a number of findings and sometimes to recommendations addressed to the main active parties in developing countries who are faced with the challenges, and often the difficulties, attendant on these changes, in order to help them to tackle them more effectively. The situation prevailing in regions such as Asia, however, is so different from that in other areas where the transport chain based on containerization is merely beginning the process of integration (Africa and Latin America in particular) that any generalization would be haphazard and sometimes even dangerous. In Asia, for example, two important trans-shipment ports, Hong Kong and Singapore, have already passed the 4 million TEU mark in total traffic per annum; this is of the same order of magnitude as the container trade recorded by all the developing countries in Africa and South America combined. There are no indications of any reduction in the disparity between these two situations.

4. Although trans-shipment activities are very often carried on by independent operators - transoceanic and feeder shipping lines, port authorities and shippers - government authorities are necessarily involved, for they can either facilitate the development of such operations or, on the contrary, slow them down or prevent them altogether. If they leave the shippers to choose the best services the ship has to offer, and contribute to the financing of all or some of the requisite heavy infrastructures, those authorities facilitate the development of the gridded networks. This is an area that calls for a pragmatic and realistic approach. The trade-off between the interests of trade, of the shippers, of the national flag and of the port authorities is a difficult operation; every case is sui generis and must be dealt with accordingly. To this end there is an increasingly clear necessity

for the ruling in each case to be made by the political authority on the basis of comprehensive and accurate technical and economic data. It is accordingly worthwhile to draw attention again to the recommendations made previously by the UNCTAD secretariat for the establishment or strengthening of shipping and port investigation units, responsible for preparing the file for such rulings and strategic choices and facilitating political decisions by making it possible to compare the expected advantages and costs of each of the options open.

5. In the specific area of ports and the choice of a national strategy by the government authorities for the development of port facilities, the emergence of these new transport techniques once again confronts the authorities with the necessity of taking highly important investment decisions while trying to foresee the subsequent behaviour of the shipping lines, which call the tune so far as trans-shipment activities are concerned. Countries which wish to invest in order to attract this highly volatile traffic, and whose own traffic is of limited volume, cannot be too strongly advised to exercise caution, and the further they are from the main transoceanic trades the greater the caution required, for the distance necessarily affects the economic prospects of the operation and reduces the potential for its development.

6. It is a different matter for countries situated on or close to the main sea routes. They are, or will be, affected by this phenomenon and should make active preparations for it. The long-prevalent policy of favouring the development of several hub ports, sometimes only a few tens of kilometres apart, must often be revised in favour of concentrating at a very few sites the heavy investments which third-generation and sometimes fourth-generation container ships require. The scale of such investments should be chosen in the light of the most objective possible estimates of the prospects for traffic development. Furthermore it seems desirable to involve the big ocean-going shipping lines in those investments - as some ports, for example in Spain, have been wise enough to do - especially where the national traffic alone does not justify the expense. In addition very high efficiency, stability and a good social climate must be guaranteed; otherwise - as there are many examples to prove - trans-shipment traffic will slip away to other ports.

7. The existence of these hub ports, veritable centres for consolidating and splitting up cargoes, goes hand in hand with the establishment - sometimes in the same country, often in neighbouring countries and occasionally in fairly distant countries - of a string of feeder ports, which are sometimes very rudimentary. These ports, situated close to centres of production and consumption, are vehicles for the development of trade and for regional promotion through the opening up of inaccessible territory. It would be desirable to give them greater consideration. For some countries not yet equipped with heavy port facilities, such ports open up worthwhile new prospects with a good ratio of service quality to investment costs.

8. At the regional level, since the study is limited in scope, it has not been possible to identify any agreements between countries concerning joint selection, financing and management of regional hub trans-shipment ports on the lines of the agreements which exist in other fields, such as that of regional training institutions. This means that any country wishing to acquire its own container reception facilities will be alone in bearing the cost (in tens of millions of dollars) and the risk.

9. The last part of the study describes the prerequisites for the successful installation of trans-shipment facilities.

10. The trans-shipment phenomenon and the associated operations of feeder lines and services already convey an idea of what transport and distribution networks will look like at the beginning of the next millennium. The main active parties are highly efficient and are putting up an impressive performance. This evolution in traditional sea transport is comparable in many ways with that observed in a great many service sectors. Without underestimating the difficulties of adaptation involved, it can be said that the process opens up new prospects and enables the most enterprising to face new challenges with the very weapons used by the pioneers in this field - drive, innovation, efficiency and often speed - in order not to be left behind. The sea transport sector has had the great merit of demonstrating that the developing countries can play an important part in this change; some of the largest shipping lines and biggest trans-shipment ports are based in developing countries of East and South East Asia. This, however, cannot conceal the fact that the vast majority of developing countries still have difficulty in fully and effectively adapting to containerization and find themselves in a situation of having to bear the cost of containerization, particularly in terms of investment, without fully realizing its benefits. It would therefore be desirable to continue studying these questions in order to enable the maritime community to find solutions that would afford those countries equal access to the benefits of innovation and progress.

11. For the developing countries, trans-shipment is not a magic wand that will sweep away the many obstacles to the development of their seaborne trade. It does, however, hold out new opportunities for a number of countries which are geographically remote or which stand to be swept aside by the present and future development of maritime trade and transport. These opportunities are not free from cost or risk for those that wish to house a trans-shipment node. In other cases, it may involve a reconsideration of shipping policies, in particular of the regulatory and promotional measures to be adopted to allow shipping to play an active role as catalyst of the country's national trade. It will be for the developing countries themselves to determine where their interest lies and whether or not to join in the trans-shipment race. Every country that wishes to take that course should include in its strategy the following measures:

- Not to over-invest, and to that end to prepare careful forecasts of traffic development and feasibility studies of port investments;
- To select the sites and not scatter the investment effort;
- To heed the competition from neighbouring ports and strive to offer something extra;
- To try to involve the big shipping lines in port investments;
- For those wishing to establish sizeable trans-shipment ports, to bear in mind that over-regulation (on cabotage, Customs etc.) is apt to divert traffic to foreign ports;

- In establishing or in promoting the expansion of a national shipping line, to take the necessary measures to ensure the competitiveness of the fleet and thus to ensure the production of an exportable service;
- Not to reject the idea of national "feedered" ports as vehicles for the development of trade and for regional promotion through the opening up of inaccessible territory;
- Not to reject out of hand the idea of specializing in regional sea transport;
- To keep in mind that - as some Asian countries have shown - the sea transport and ports of developing countries may, given efficient management and competitiveness, be industries producing exportable services.

I. INTRODUCTION

12. The Ad hoc Intergovernmental Group of Port Experts, meeting at Geneva from 25 February to 5 March 1986, examined the secretariat report entitled "Trans-shipment ports" (TD/B/C.4/293). In the course of discussion it was emphasized that trans-shipment traffic was often started on the shipowner's initiative and sometimes came to a swift end; in such cases, port authorities might find themselves involved in over-investment. Some experts from developing countries then pointed out that shipping lines wishing to use a port as a trans-shipment centre were usually reluctant to make financial commitments or to share the cost with the port authorities. It was also suggested that steps should be taken to avoid undue competition between ports. The consensus of opinion was that the question of trans-shipment needed more detailed study.

13. By resolution 61 (XIII) of 22 March 1988, the Committee on Shipping invited the Secretary-General of UNCTAD to convene a further meeting of the Ad hoc Intergovernmental Group of Port Experts to review the practical problems which arose in respect of the development, improvement and operation of ports. The Group was further requested, in the light of that review, to examine the secretariat's work in relation to the three highest-priority studies requested at the first session of the Group, and in particular that dealing with problems arising in setting up trans-shipment facilities in developing countries (taking account of the interests of both ports and ship operators).

14. The present report has been prepared in response to that request and in order to facilitate the work of the Ad hoc Intergovernmental Group of Port Experts, which is to meet at Geneva in September 1990. It has, in addition, been designed to help the port and shipping authorities of developing countries to prepare for the changes taking place in the sea transport sector, of which trans-shipment activities form only one aspect that cannot be fully understood without examining the entire process that generates them. There is a great deal at stake. The relationships between the forces in the field are taking on shape and structure. Some are worried that the developing countries may be left out. Others see in the situation opportunities for participation or for the development of supplementary or replacement activities. What is more, such questions are not confined to the sea transport sector. They arise in similar terms in all service sectors.

15. The scope of the report has been limited to container traffic, for it is in relation to this traffic that the idea of trans-shipment has developed on the largest scale and for the greatest number of countries. It should be mentioned for the record that trans-shipment ports have also been set up to handle bulk cargo, in particular petroleum products and ores. Such traffic is highly specific and a supplementary study might be prepared on it later on if necessary. The same applies to what is termed "neo-bulk" traffic, for example in sawnwood, which also makes use of trans-shipment.

16. The report has been prepared on the following pattern. The first part examines the nature of trans-shipment and of its problems, in particular those of an economic nature. The next part reviews the development of trans-shipment container traffic in the main regions of the world. The last part reviews the prospects for the development of trans-shipment facilities and activities in developing countries.

II. DEFINITIONS, TYPOLOGIES AND PROBLEMS OF TRANS-SHIPMENT

A. Definition of trans-shipment

17. The term "trans-shipment" will be used here in its dictionary sense to mean the transfer of goods, in this case a container, from one ship to another. The operation generally includes some period during which the container is kept in the yards of the port where it has been unloaded. It is very unusual to have a situation in which the container can be trans-shipped directly from one ship to another or to a barge. The term "trans-shipment" is sometimes misused in another sense which is apt to cause confusion: what is meant is simply unloading from the ship. We sometimes read or hear that a particular ship has "trans-shipped" such and such a quantity of goods. Sometimes too the term "trans-shipment" is used to mean the transit operations carried out on goods unloaded at a port en route to another country, often a landlocked one; the expression "transit", "pre-haulage" or "post-haulage" would be more appropriate.

18. There is, however, a particular form of trans-shipment as defined above which is of particular and growing interest: this is the transfer, at a port, of a container from a ship to an overland mode of transport (rail or road) for carriage to another port which is often remote from the first one (e.g. from the East to the West Coast of the United States), where it will leave on another ship. This introduces the idea of the "land bridge". This type of operation, which may be regarded as an extended form of "trucking" between two quayside berths in the same port, is identical in purpose to trans-shipment, since it involves transfer from one ship to another even though it is deferred in time and space.

B. The various forms of trans-shipment

19. The notion of trans-shipment is associated with a system of ship operation composed of a main or parent line - usually a transoceanic line - working out of trans-shipment or hub port and one, or usually more, feeder services to the ports of the surrounding region. However, there are variants.

Scattering/feeder trans-shipment

20. This is the most traditional form of trans-shipment, in which only the main port in an area is served by the mothership and serves as the trans-shipment port for freight bound for or coming from other ports in the area: either minor ports at which the mothership cannot put in, or sizeable ports which, if there were too many of them in the same area, would involve too many stops and an increase in the mothership's costs.

21. As a rule the port which handles the most traffic is chosen so as to limit the flow to be feedered, but not always; an individual port's efficiency or geographical position may be the main deciding factor.

Inter-line trans-shipment

22. This is the operation performed by a transoceanic shipowner who, in operating a line, arranges for it to intersect, at a port of recognized speed

and efficiency, with another line belonging to him or to another shipowner with whom he has concluded an agreement. The containers move from one mothership to another or to a feeder as required. In the process, the shipowner:

- Makes better use of the container ship's capacity than a single route's own traffic may be able to guarantee;
- Increases the number of ports served from one port of shipment.

23.. The special feature of inter-line trans-shipment traffic is that it does not require a priori a port with heavy traffic of its own and a well-developed hinterland. On the other hand, handling costs and the length of port time remain primary considerations.

"Switching" trans-shipment

24. This is a variant of the arrangement just described in which small volumes of cross-traffic can be dealt with by connecting them, at a trans-shipment port, with the main North-North and/or North-South sea routes. This practice may be illustrated by the development taken by the trade of certain former colonies with industrialized countries other than the former colonial Power. These new "cross-currents" of trade are far from attaining traffic levels sufficient to permit the establishment of direct sea routes of a commercially satisfactory frequency (such as 7 or 15 days) and at an acceptable cost, but switching enables them to reach their destination quickly after passing through one or sometimes two trans-shipment ports.

"Catch-up" trans-shipment

25. This consists in cancelling one of the stops made by the mothership and serving the port concerned by a feeder vessel in order to make good a delay in the use of the mothership's time. It is thus an ad hoc operation, not planned in advance, to enable the vessel to gain time.

By-pass trans-shipment

26. By-pass trans-shipment is practised, for example, in northern Europe, where urgent transoceanic freight "leap-frogs" the main Southampton-Le Havre route in order to avoid making the rounds of the North Sea ports with the mothership. With this practice, urgent freight is saved the round trip over the downstream part of the loop and feeder freight saves transit time, sometimes substantially. With this operation, as distinct from the previous one, it is a batch of containers, and not the ship and its entire cargo, that gains time.

Land bridges and mini-land bridges

27. The progress of containerization has led to the development of "door-to-door" intermodal transport. Furthermore the substantial increases in productivity achieved in rail transport (using block trains and double stacking) and road haulage have greatly expanded port hinterlands and made it feasible to use land bridges, e.g. the American and trans-Siberian land bridges, in certain regions.

28. Similarly long-distance pre- or post-haulage overland - in other words, a mini-land bridge - from the main port may prove more profitable than feeding by sea to a port closer to the consignee or his shipper, especially where there are constraints of regularity and frequency to be reckoned with.

C. The various kinds of trans-shipment ports

29. The various ports directly or indirectly involved in trans-shipment operations may be divided into four main categories:

- dedicated hub ports;
- hub and load-centre ports;
- direct-call ports;
- feeder ports.

30. The sole purpose of this classification is to make the trans-shipment process easier to grasp and to enable port authorities, particularly in developing countries, to see more clearly where they stand in relation to it. There is bound, however, to be some overlapping between categories. Furthermore, trans-shipment is a highly volatile phenomenon, for differentials of cost and time may cause slippage from one category to another.

(a) Dedicated hub ports

31. These are ports situated either at the intersection of main sea routes or at one end of such routes at a place where the flow of container traffic is to be split up to serve the ports of the neighbouring area. In the former case, an inter-line or switching trans-shipment as defined above will be carried out. In the latter case there will be a scattering or catch-up trans-shipment. Dedicated hub ports are few. They are to be found in favoured geographical areas and at favoured sites which can berth motherships.

32. These ports are veritable nodal points where container flows intersect without, as a rule, going inland; their own national traffic is on a limited scale (10 per cent of the total at Algeiras).

(b) Hub and load-centre ports

33. These ports are comparable to those of the previous category so far as trans-shipment operations are concerned. They can accommodate all kinds of trans-shipment according to requirements: interlining, scattering for delivery in the neighbouring area, switching, catching-up and by-passing. They differ from those in the previous category, however, in that they also carry a substantial traffic of their own bound for or from their hinterland.

34. Several of the big ports situated on the main transoceanic routes fall into this category; Rotterdam is an example. They vary more widely in technical characteristics. The biggest such ports have to meet the same requirements as the ports previously described and must in addition be equipped for the traditional operations of container stuffing and stripping, Customs clearance and haulage of goods. There is an increasing number of such

ports, and this development is leading to the creation of subcategories. The term "megahubs" is now being used to describe ports which have passed or are approaching the 4 million TEU per annum mark (Hong Kong, Singapore, Rotterdam); the term "superhubs" is used for the 10 or so which have passed the 1 million TEU per annum mark; and the remainder are "hubs". This development is understandable, for such ports, having a substantial traffic of their own, can provide a high density and frequency of departures that attract big shipping lines, feeder services and shippers.

(c) Direct-call ports

35. These are also situated on the main transoceanic routes and their main ambition is to remain on the list of ports of call for motherships in order to avoid being "feedered". Their traffic is generated essentially by their own hinterland. Direct-call ports enjoy competitive freight rates and the quality services rendered by big shipping lines on the principal routes.

(d) Feedered ports

36. This category comprises all ports which receive only feeder ships to load or unload containers carrying the trade of the surrounding area. They are thus situated at the end of the branch routes into which the traffic from the ports in the first two categories splits up.

D. Legal aspects of trans-shipment

37. In a trans-shipment operation, generally speaking, the goods do not enter the country or, more accurately, they enjoy a special Customs régime of extraterritoriality or exemption from duty in the country where trans-shipment takes place even if the container is kept in storage areas or travels through the interior. This, however, does not prevent the police or Customs from making any necessary checks where unlawful activities (drug smuggling, arms running, etc.) are suspected.

38. Before the advent of containers, gridded networks of transoceanic routes and trans-shipment ports, the operation of trans-shipment had a different connotation and was associated with an amendment to the clauses of the contract of carriage by sea because the goods were transferred from one ship to another for reasons unforeseen at the outset. It was consequently defined as follows:

"Trans-shipment without legal excuse is a violation of the contract and subjects the carrier to liability if the goods are lost. In marine insurance, the unnecessary trans-shipment of cargo from one ship to another is considered such a variation of the risk as to discharge the underwriters of the risk unless liberty to trans-ship is given by the policy." 1/

39. The trans-shipment of a container from one ship to another usually escapes such penalties, for it is planned in advance and the container is the subject of a through bill of lading between the initial port of shipment and the port of final destination.

40. In recent years there has generally been a relaxation in attitudes towards trans-shipment on the part of cargo and other interests in the general

cargo trades. It is relevant to note that the International Chamber of Commerce publication Documentary Credits: Uniform Customs and Practice for Documentary Credits says that:

"Unless trans-shipment is prohibited by the terms of the credit, banks will accept transport documents which indicate that the goods will be trans-shipped, provided the entire carriage is covered by one and the same document." (Art. 29B of ICC Publication No. 400 of 1983).

41. In practice the trans-shipment of containerized cargo meets with little objection in many parts of the world, though there are certain regions where it is still regarded as being unacceptable unless explicitly authorized.

E. The problems of trans-shipment

1. Historical background and economic environment

42. Trans-shipment is not a new practice. It has often been a means of serving ports that were of limited draught, difficult of access or ill-equipped, or which presented technical or political risks. The practice evolved essentially to deal with bulk cargo, especially petroleum products, where its cost is least burdensome. In general-cargo carriage, the advent of the container has given special impetus to trans-shipment as a means of increasing productivity.

43. The development of trans-shipment on the scale observable today is the outcome of decisions and technological innovations made by carriers aiming at general integration - and often control - of the transport operation from beginning to end, and at the same time seeking greater efficiency and thus a better quality-cost ratio that would bring them a greater return on their investments. This development has taken place under the pressure brought to bear upstream and downstream by the market forces of the products carried, which has mounted in a setting of keen competition that has required boundaries to be pushed back, trade integrated, costs brought down and better services rendered.

2. The motives and economic reasoning of the big transoceanic shipping lines

44. The better to adjust to market requirements, the big shipowners have brought into service third-generation and fourth-generation ocean-going container ships (see annex I) which use economies of scale to bring down the unit cost per container carried. 2/ These container ships, however, operate at full efficiency only when they sail fully laden on deep-sea routes; they are increasingly ill-suited to the traditional practice whereby the ships themselves have to pick up or set down freight at every port in the range of ports they serve.

45. This led to the idea of concentrating their stops on a limited number of main ports, or even one such port, that were particularly efficient and easy of access, and of using those hub ports as the nodes of intersection of a veritable network of main and secondary sea routes, so that cargoes might be combined or "massed", ships better filled and the number of ports servable from each port in the network increased.

46. Present-day trends in containerized sea transport thus point to a steady supplanting of the traditional idea of the direct sea route port-to-port (and often of the power of the Conference that controls it), in which the ship, the cargo and the ports are closely associated, by distribution over a network which is comparable with road networks comprising main trunk roads and an associated system of secondary roads, and also with the new patterns of air transport - the hub and spokes. The container is severed from its rigid connection with the mothership in order that, through the meshes of a network built up around a number of junctions or hub ports, it may take the best route - whether it be a sea route, using coasters or feeders, or overland by road or rail, in which case multimodal techniques must be employed to connect the shipper with the consignee.

47. The "round-the-world" services introduced a few years ago by US Lines (which has since gone out of business) and by Evergreen are merely one form in which this trend makes itself felt. The introduction of "over-Panamax" container ships, which cannot pass through the Panama Canal, makes for the return to "shuttle" services on certain routes but does not call into question the existence of the gridded networks which the containers follow.

48. Econometric calculations of the optimum size for a container vessel have had a definite influence on the organization of this new type of shipping service. The optimum size is the result of a compromise between economies of scale on the cost per slot-mile and the cost of keeping the ship berthed in port. It thus depends, among other factors, on the length of the voyage and the characteristics of the ports. These economic considerations have produced a definite trend towards increased ship size, which presents the problem of how to operate the ships intensively enough to keep them competitive and fill them enough to make them profitable. A few companies operate such ships singly, but the question of economies of scale and trade requirements with regard to frequency of service, which is more and more often required once a week, have led shipowners to form consortia on a number of trades. This makes it easier for them to assemble the large quantities of goods required for frequent and competitive sailings and sometimes even enable them to increase the number of direct calls.

49. The shipowner, being in control of the generation of trans-shipment traffic, has often obtained highly favourable tariff terms from competing port authorities, who have made great efforts both in investment allocations and in the efficient organization of operations. It has thus been possible to minimize the cost of the double port handling which trans-shipment entails (about \$150-200 per TEU in Europe). Indirect sea transport interrupted by a call at a trans-shipment port may ultimately become a better bargain than direct haulage port-to-port. For example, the Conference quotes between \$US 2,000 and 2,500 per TEU from Europe to the Caribbean, or even more for certain countries such as Haiti. Yet the main Europe-Miami lines charge some \$800-1,000 for the same TEU. When the cost of trans-shipment is added, it will be seen that there is a sizeable margin left to cover the journey to the nearest islands of the region. 3/

50. Trans-shipment clearly has a favourable effect on the cost of operating the ocean-going ship called the "mothership", and on transit time between trans-shipment ports, for it limits the calls for the mothership and increases the density of traffic, which means a reduction in waiting time. It nevertheless means using less cost-efficient vessels on the approaches to

secondary ports and, more important, additional handling, the cost of which is a vital consideration in weighing the case for and against trans-shipment. The big shipping lines sometimes employ dedicated feeder ships in order to ensure that connections are made precisely and efficiently. Where the common carriers give satisfaction, the feedering is entrusted to them.

51. Thus, when the entire operation is well planned and organized, the advantages of flexibility afforded by the modular management of containers are combined with the advantages of productivity and economy of scale afforded by the latest innovations of ship design and harbour technology so as to enable the shipowner to give the shipper a "made-to-measure" service. A new idea, rich in potentialities for economies of scope, is thus dawning on the marine horizon; through integration of all the services rendered, those economies help to improve the quality-cost ratio of each service.

3. The port authorities' point of view

52. Port authorities, for their part, are keenly interested in trans-shipment traffic, in which they see sizeable advantages to be gained both directly and indirectly. In a trans-shipment operation the container is handled twice on the outward leg of the journey and often twice more on the return leg, which means an increase in the number of harbour operations (and the earnings thereon) for the same volume of shipping traffic. It should be noted that, whether the containers are handled at a direct-call port or at "feedered" port, the volume is unchanged; on the other hand, the ships may be different in size and number. The volume of traffic will increase only at the trans-shipment ports. A port loses traffic when containers which formerly came by sea use overland haulage or when some of its trans-shipment activities are transferred to another port.

53. Trans-shipment activities also bring other benefits to the port community: bunkering and repairs for the ships, container maintenance, shipping agencies, insurance, sometimes free zones, etc. The port's hinterland also benefits, for trans-shipment brings large motherships which the port's own traffic would not have attracted, thus giving it access to better freight rates and a higher quality of service. The development of trans-shipment activities at Algeciras, for example, has made some of the agricultural produce of the surrounding area competitive in the international market.

54. It is thus understandable that keen competition should spring up between ports in the same area for shares in a trans-shipment market, to the point where the information and port statistics that would assist in a closer study of this phenomenon are rarely available.

55. However, the development of large harbour terminals for the latest generations of container ships is a very expensive undertaking, running into the tens of millions of dollars. ^{4/} Since the big shipping lines and not the port authorities call the tune in this matter, there is a real risk of over-investment when several ports in the same area equip themselves to attract the same shipowners.

56. From the standpoint of the port authorities considered in isolation, trans-shipment traffic is certainly of great interest, but it is volatile and very demanding and thus entails a degree of risk which calls for careful evaluation.

4. The shipper's point of view

57. These preliminary remarks cannot be concluded without considering what the shipper stands to gain from such an operation. Are the savings achieved by this operation passed on to freight rates, to the ultimate benefit of the development of foreign trade? It will be seen later on that, in the course of the investigation carried out by the secretariat, it was possible to identify with certainty some cases in which the trans-shipment operation was beneficial to the country - so beneficial that previous shipping legislation was reviewed to enable the shipper to increase his choice of carriers and transport routes affording him the best quality-cost ratio.

58. The advantages to the shipper do not lie solely in reduced freight rates. To these must often be added a higher frequency of services, which is much appreciated in the present context of efforts to reduce idle time and stocks; a chance to be paid earlier; and a greater assurance that the contract of carriage will be properly performed with the powerful resources the operator has brought to bear. There is no doubt that, when the shipper has a choice and can take advantage of competition, he is generally the gainer. However, the problem is complicated and there are no hard-and-fast rules, for some countries consider it necessary to protect their budding shipping industry and, despite these advantages are unwilling or reluctant to lose some of their sea traffic to big shipping lines and see their fleet reduced to a feeder role.

59. The crux of the matter, however, appears to lie elsewhere. It should be clearly understood that trans-shipment is only one aspect of a great change that is taking place in the development of trade. We are at the dawn of a new era that will see the development of economic systems generating greater flows of goods, services, people and information than those we have known. In this new international trade situation, some active parties in developing countries will prove better able than others to make their way and to build up new relative advantages.

60. Some developing countries which are already exporters of manufactures but do not have a large enough volume of trade maintain competitive direct links have opted for the trans-shipment solution, for it has enabled them to gain the few (and sometimes more than a few) points that make the difference between losing and gaining a market. It is, however, necessary to make sure that the advantages thus gained will justify the sacrifices entailed.

61. The topics touched upon above will be discussed in more detail in the chapters that follow.

III. THE DEVELOPMENT OF TRANS-SHIPMENT WORLD-WIDE

62. A brief review of the present situation in each of the world's main regions will give all the countries concerned a clearer idea how the principle of trans-shipment is being applied and what the prospects are for its future development.

63. Special attention will be paid to the regions in which trans-shipment has undergone the greatest development: South and South East Asia, northern Europe, the Mediterranean area, the Persian Gulf and the Caribbean. The information available on these regions is full of lessons for all regions, all developing countries and all active parties - government authorities, ports, shipping lines and shippers - who contemplate setting up or developing trans-shipment activities and facilities in a given country. The information given here was collected in the course of 1988 and 1989; 5/ since this is an area of swift change, some of it may already be out of date.

64. Annex II to this study lists the technical characteristics of the main trans-shipment ports mentioned in it. The list is not exhaustive; it is intended only to illustrate the efforts which the port authorities in the countries concerned have been making; but it will be useful for the developing countries to know about them.

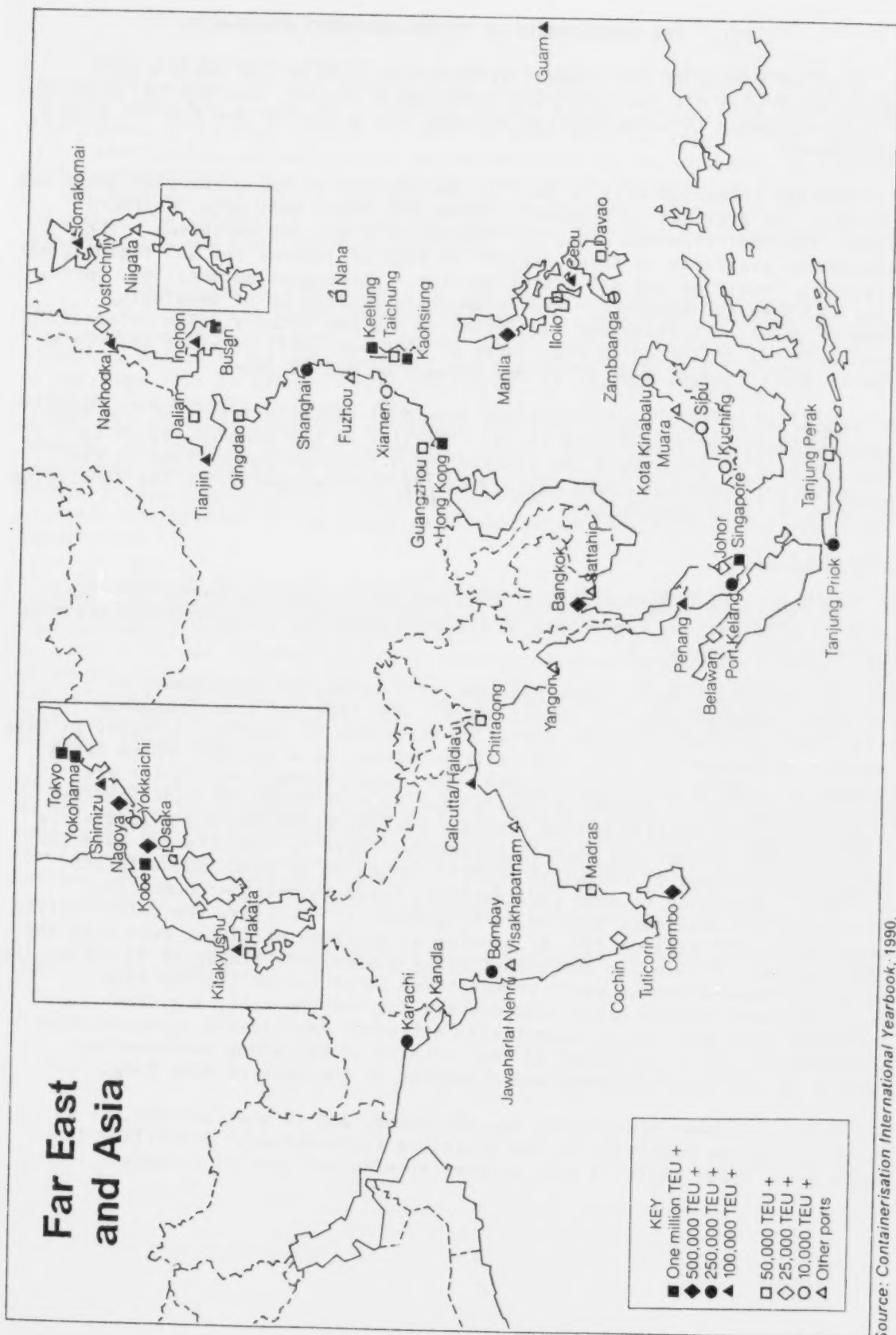
South-East Asia

65. It should be underlined that containerization has reached a very high level in this region, where some of the most important containerized ports of the world are located. 6/

66. In South-East Asia, there has been very extensive development of container trans-shipment in recent years. All types of trans-shipment activities and trans-shipment ports, as described in chapter II, exist in this region. Singapore has been especially prominent as a hub port where large volumes of traffic are trans-shipped. No trans-shipment statistics are published, but it is estimated that 60 per cent of Malaysian containerized trade (including traffic moving overland between Singapore and Malaysia) is trans-shipped through the port of Singapore. This is likewise the case for substantial volumes of container traffic moving to or from Indonesia and Thailand. According to some publications, trans-shipment accounts for two-thirds of containers handled in Singapore. 7/ In 1989, the total traffic amounted to 4.05 million TEU, 8/ showing an increase of 27 per cent over the 1988 figures. Within its South-East Asian hinterland, Singapore is indeed the paramount trans-shipment port, though there is of course overlap with trans-shipment through other load centres outside the area, e.g. Kaohsiung (although that port has an essentially different Pacific Rim trans-shipment hinterland). It is estimated 9/ that a third of Kaohsiung containerized traffic is for trans-shipment and a quarter in the case of Hong Kong.

67. Trans-shipment hinterlands are not fixed, and in that context, it is worth noting the expansion of the Singapore trans-shipment hinterland in South Asia, where there is also an overlap with the port of Colombo.

Figure 1



Source: Containerisation International Yearbook, 1990.

68. Trans-shipment in Singapore actually covers a very wide geographical area. Indeed, apart from feedering, it can and does also include the interline linking of different shipping services, e.g. from Europe to Singapore and from Singapore to Australia. Mention should also be made here of sea-air trans-shipment activities, which are developing rapidly.
69. The magnitude of the growth of trans-shipment in relation to ports in South-East Asia has been affected by certain basic factors: by geographical location and by the additional costs of serving various ports in certain countries direct, e.g. in Thailand, Indonesia and the Philippines; by the high quality of services offered by certain ports of the region; ^{10/} by the major growth of trade, e.g. of exports, of certain countries in the region; and where relevant, by the potential to improve the utilization of capacity of line-haul services passing through the region by inter-line trans-shipment.
70. The extent to which trans-shipment has developed has varied in relation to different countries, between different operators, and indeed between different trade routes. For instance, Indonesia is not directly served by the vessels of P & OCL operating between Europe, Singapore and East Asia, but it is served directly by the same company's vessels operating from Australia. There are various reasons for such differences in the patterns of direct port calls, and therefore of trans-shipment requirements, e.g. differences in vessel deviation distances, differences in the availability of vessel time to make additional calls, differences in available vessel capacity to accept additional cargo, and differences in vessel size, affecting the cost of additional calls and so affecting their financial viability. Operators will each make their own assessment of the scope to trans-ship at the relevant hub port, in this case Singapore.
71. Feeder vessel size in South East (and in East) Asia has been increasing, from around 200 TEU a few years ago to more than 1,000 TEU. Substantial operations have been built up. For instance Regional Container Line (RCL) now operates a range of vessels of up to, and slightly over, 1,000 TEU. Similarly, the Uniglory Line, a subsidiary of Evergreen Line, currently operates some 14 vessels in the 500 TEU range and is expected to opt for a ship size of about 1,200 TEU. ^{11/} The increasing size of the feeder vessel generates further economies of scale for the whole operation but puts additional pressure on the technical and operational characteristics of the feedered ports of the region.
72. In some cases feeder services are provided on a dedicated basis, e.g. the "Duo" services of Ben Line and P & OCL between Bangkok and Singapore. However, decisions as to the provision of dedicated services have to take into account relevant commercial, competitive conditions. Between Singapore and Indonesia, Ben Line and P & OCL use common user container services to meet their requirements - because they simply could not compete, in terms of service frequency, with the daily (or even more frequent) availability of the common user services.
73. Some feeder services have been developed jointly by local and foreign shipping interests; this applies, for example, to RCL, a joint venture between the Singapore Shipping Corporation and the (Thai) Ngai Hock Shipping Company. RCL now operates a range of feeder services linking Singapore with ports in Thailand, Malaysia and Indonesia. There are also other examples of feeder shipping services that are provided on a joint or collaborative basis and

which may involve companies located in South-East Asia. For instance, OOCL provides a 600 TEU vessel on a joint service with the (Indonesian) Karana Line between Kaohsiung, Hong Kong, Singapore, Jakarta and Surabaya (and it is also involved in a joint service with the Panasia Line between Kaohsiung and Manila, this involving the use of a 300 TEU vessel).

74. Inter-line trans-shipment is in general carried out (as explained in chapter II) to make more economic use of an operator's shipping capacity, and by so doing to reduce per-unit costs. It may also be carried out for competitive purposes, to enable shipowners to compete for additional traffic flows. Indeed, some ship-owning interests are known to be concerned with the growth of competition in "North-North trade", precisely because of the scope for inter-line trans-shipment at Singapore.

75. At this stage, it may be helpful to describe an example of the actual impact of trans-shipment in South East Asia, with regard both to the benefits and costs to which it has given rise. A combination of the economics of container ship operations and the increasingly competitive situation within shipping because of containerization has led to a growth of trans-shipment, and in some cases to significant decreases in freight rates. The most notable example has been in relation to Indonesian containerized cargo. The rapid growth of containerization and a deliberate and far-reaching liberalization of shipping in 1985 (which made possible the rapid growth of trans-shipment, in practice very largely through Singapore) resulted in reductions in the freight costs of shipping containerized cargo - including trans-shipment - e.g. to Europe of about 30 per cent, with even greater reductions on cargo that continued to move on the direct shipping services to Europe. At the same time, with the easing of former restrictions on the ports that could be used by export cargoes, some exporters also gained from reduced transport costs to their nearest potential export port. Importantly, exporters have also gained from the far greater sailing frequency of the feeder vessels, e.g. with at least one daily sailing from Jakarta to Singapore. With the availability of fast and frequent shipping services from Singapore, shippers can meet contractual delivery dates and indeed receive earlier payment. All this contrasts well with a previous situation (in relation to Europe) when transit times were far longer and much less certain, and when freight rates were substantially higher than from relatively nearer Malaysian ports.

76. Against these benefits to Indonesian exports, the attainment of which had been among the objectives of the new policies introduced in 1985, must be set the costs. The Indonesian national lines have inevitably suffered, both in the loss of traffic to competing lines operating out of Singapore and because of the reductions in freight rates. All this has inevitably had a negative financial impact on the lines concerned and, incidentally, has accelerated the competitive pressures affecting the use of older types of vessels, whose life might have been somewhat prolonged if the lines had remained protected against trans-shipment and competition from outside operators. In effect, this may have given rise to what the national flag shipowners may perhaps have regarded as premature obsolescence.

77. As far as Malaysian cargo is concerned, the advantages of trans-shipment via Singapore have attracted a substantial proportion of the Malaysian container traffic, as already mentioned. The frequent availability of sailings from Singapore is an important factor in helping to bring forward the dates of payment to shippers. The importance of this time factor - very

relevant for trans-shipment decisions - can be seen, for example, from the routing of UK-trade containers exported from or imported into Penang. Such containers are exported from the Port of Penang by feeder vessel to Singapore, again bringing forward payment dates (to the date of shipment onto the feeder vessel). By contrast, where import containers are concerned (and where no such early payment incentive exists to encourage trans-shipment), there is a greater possibility that the containers will move through a national port, Port Kelang, and thence by railway to Penang. Such a trend has been encouraged, and Port Kelang is being promoted to retain the national traffic.

78. The major trans-shipment ports of the subregion have commenced ambitious development plans to cope with future container requirements. However, some voices have also been heard underlining the risk of overinvesting in competing port facilities. ^{12/} Hong Kong is planning to invest \$US 16.2 billion in order to multiply its trans-shipment capacity by five by the year 2006. Singapore is also investing \$S 1 billion and will double its present capacity by 1992. Taiwan Province of China is making huge investments which will increase the Kaohsiung container terminal capacity to 6 million TEU a year in 10 years' time. In the Republic of Korea, \$US 241 million have been invested to increase the container terminal capacity. In Malaysia there is a development plan for the main container ports amounting to over \$US 370 million. In Thailand, the new port of Laem Chabang will be open in 1992 and the container port capacity will be increased by 50 per cent.

79. It has been estimated ^{12/} that the containerized trade of Asia, which increased from 18 per cent of the world total in 1977 to 30.8 per cent in 1988, could reach 50 per cent in the year 2000. The traffic increases obtained by the major trans-shipment ports are impressive: Hong Kong - 2.7 million TEU in 1986 and 4.5 in 1989; Singapore - 2.2 million TEU in 1986 and 4.5 in 1989. The other main ports are also progressing, though more slowly: Bangkok - 0.5 million TEU in 1986 and 0.8 in 1988; Manila - 0.5 million TEU in 1986 and 0.7 in 1988, etc. In the years to come we could have an extension of the present trends, with a very few additional "mega hub" ports (e.g. as a result of the Hong Kong trans-shipment activities with China increasingly), "trunk" lines and dedicated feeder services of increasing size.

South Asia

80. In India, new specialized ports have been developed for container traffic in recent years. During the early 1970s, a new port was developed at Haldia, primarily to provide for the expected growth of containerization, which was anticipated to be beyond the capacity of the port of Calcutta.

81. More recently, in 1989, the new Jawaharlal Nehru port was opened at Nhava Sheva. In terms of marine access, this port is near Bombay and is intended to serve both container ships and bulk carriers. This is potentially a hub port. Nhava Sheva has its own substantial hinterland in the Bombay area, extending up to Delhi and Central India, and its use could also tie in with vessel movements in some Persian Gulf trades. Geographically therefore, Nava Sheva has far more trans-shipment potential than Haldia.

82. Apart from these ports, the most important other container development in recent years has been at Madras, where container port facilities of good quality have been developed at what must be an attractive location for

container shipping, giving mainland port access to Indian traffic (and indeed, marginally reducing trans-shipment distances by sea to/from the ports on the East Coast of India and in Bangladesh).

83. In practice, although substantial port investments have been made, none of these ports have yet attracted and retained the volumes of container trans-shipment that they had hoped for. This is an illustration of the fact that the development of trans-shipment activities is not necessarily linked to the efforts made by the ports to attract them. The same applies to the ports in other countries on the South Asian mainland. In the case of Bangladesh, the geographical location of the ports in relation to the major East/West route and its implications in terms of vessel deviation from major shipping routes are not facilitating the development of the trans-shipment port, and the absence of sufficient national cargo to attract large container vessels to make direct calls (if these could physically be accepted) simply reinforces this view. In fact this situation should contribute to the development of feeder traffic.

84. In Pakistan, the situation is somewhat different in that port calls by potentially relevant container shipping services would involve less deviation than (say) calls at Bangladesh ports. However, the nature of the existing port facilities, their capacity in relation to demand, and also the consequent possibilities of vessel delay have so far prevented the development of any significant volume of trans-shipment.

85. In practice, despite the existence of potentially attractive - and attractively located - ports in India and Pakistan, substantial volumes of traffic to or from these countries are trans-shipped. While trans-shipment has generally become acceptable to cargo interests, feederage may increase transport costs. Some ports are avoided by direct call vessels because of expected delays or uncertainties. For example, where vessels are carrying cargo where transit time is especially important, e.g. vessels carrying frozen meat with a fixed shelf life, direct calls at a "slow" port may be avoided for precisely this reason.

86. There may also be legislative reasons why particular ports are not served direct. For example, in South Asia as elsewhere, there may be countries where cabotage laws in practice make it difficult for foreign shipowners to be involved in coastwise feederage activities, which may result in cargo being lost to trans-shipment in a foreign port where no cabotage restrictions apply.

87. The position is very different in Sri Lanka, where Colombo both has an inherent geographical advantage as a trans-shipment port and has made the most of that advantage. The location of Colombo for trans-shipment is excellent, involving little deviation for vessels sailing, for example, between the Far East and South-East Asia and regions in the Arabian Gulf, beyond Suez or in East Africa. As relevant, the same applies to vessels sailing from these various regions either to the East Coast of India/Bay of Bengal ports or to West Coast of India/Pakistani ports. However, Sri Lanka's domestic (i.e. non-trans-shipment) traffic is not very great, and during the 1970s the port of Colombo was very under-utilized, indeed in apparent decline. Since that time, there has been a remarkable change of activity.

88. Colombo has become an important hub port, with trans-shipment representing a significant proportion of trade. In 1981, Colombo handled a total of 58,000 TEU, 13 per cent of this comprising trans-shipment traffic. Five years later, domestic container traffic had more than doubled, but trans-shipment trade had increased to 220,000 TEU. Further expansion was made possible the following year, with the opening of the new Jayawardene Terminal, and during the first 10 months of 1987, 82 per cent of the traffic through that terminal consisted of trans-shipment cargo. In 1987, total traffic amounted to 429,000 TEU and in 1988 to 621,000 TEU.

89. Indeed, the use of the Jayawardene Terminal has had to be rationed, with priority being given to vessels that can reliably indicate their arrival dates. Colombo's success in attracting and retaining a substantial volume of trans-shipment business obviously was only made possible by its location in relation to relevant flows of shipping. However, this by itself would not have been sufficient, and its success has also resulted from policies followed and action taken by the Sri Lanka Government and by the Sri Lanka Port Authority to make Colombo the port actually chosen by shipowners for trans-shipment. This has included the carrying out of the necessary investment in port facilities, but it has also included giving to the port authority a management structure free from undue government intervention, with ability to follow appropriate port marketing policies - including the ability to make quick decisions on setting port tariffs. The port is also free from unduly onerous Customs regulations, so there are no problems for trans-shipment cargo. There are also no shipping policy restrictions that might, for example, restrict the port's effective ability to attract foreign flag shipping.

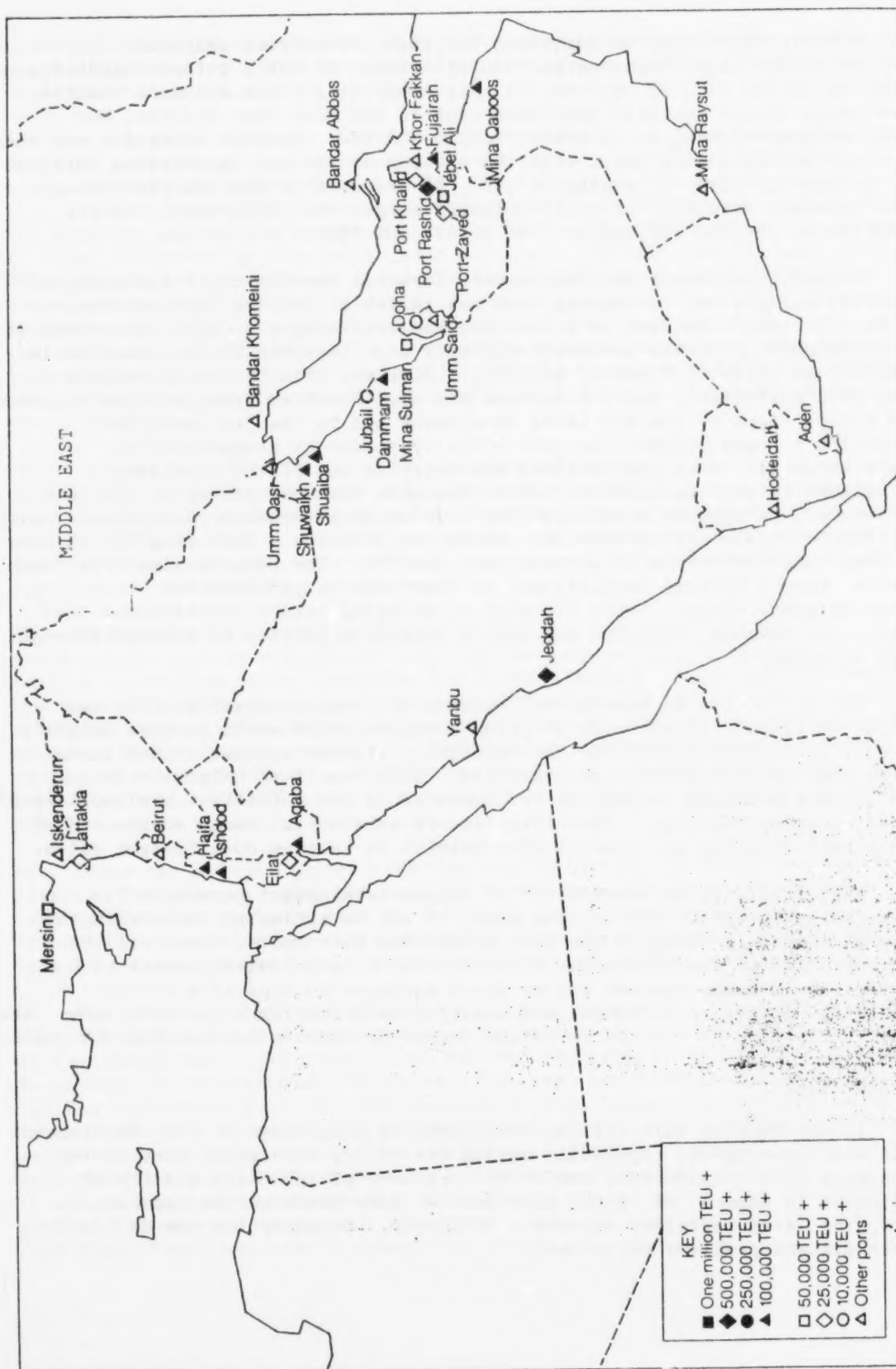
90. The attraction of substantial volumes of trans-shipment traffic has helped to attract direct call shipping services which would be most unlikely to call at Colombo solely for the relatively limited volumes of Sri Lanka cargo that would otherwise be available. This itself is helpful - in the past, there had been concern in Sri Lanka as to the sufficient availability of liner shipping services. The attraction of substantial cargo volume and of additional shipping services is also helpful in keeping down freight rates.

91. With regard to an examination of future development prospects for trans-shipment activities in this area, it can be estimated that, with the size of vessels growing on the main Europe-Far East route, there will be a concentration of trans-shipment activities on a very limited number of hub ports (e.g. Colombo and one Indian port) equipped to cope with fourth generation vessel requirements and ensuring excellent working conditions. The other ports will be visited by either feeder or smaller vessels (direct calls).

Persian Gulf

92. In the Persian Gulf region, the extensive programmes of port development that were undertaken, especially during the 1970s, have given rise to the existence of a considerable number of container ports. High quality of equipment is common, as is the existence of deep-water berths capable of accepting large container vessels. Obviously, the exception can be found where draught problems may arise.

Figure 2



Source: Containerisation International Yearbook, 1990.

93. The Iran-Iraq war in fact had very important consequences for the development of trans-shipment in the Persian Gulf, both during the war, and subsequently. During the war, many operators became reluctant to permit their vessels to sail to various Gulf ports, and goods had to be trans-shipped intermediately instead. The rapid growth of trans-shipment because of the war situation keenly sharpened the awareness of shipowners as to the potential scope for savings. In view of this satisfactory experience, trans-shipment has since continued to play an important role in relation to shipping in the Persian Gulf. In this situation, many operators continued to concentrate their main line calls at a single Gulf port. Dubai is an example, and while the Dubai port (or more correctly, ports) provide by no means the only location for trans-shipment in the Gulf, Dubai has in fact become a substantial trans-shipment centre (including for sea-air trans-shipment activities) and has attracted the necessary feeding services. There are in fact a range of possibilities, and Dubai by no means provides the only potential Gulf location for trans-shipment. APL, for example, only use Fujairah (where a post-panamax gantry crane has been installed) on a service from Singapore and Colombo.

94. Decisions to concentrate cargo at a single Gulf port, with trans-shipment through that port to or from other Gulf ports, may also be made for other reasons such as the additional time implications of extra port calls on vessel frequency (assuming that a fixed number of vessels is used) and on cargo transit time. Theoretically, it would be possible to maintain unchanged vessel sailing frequency, with additional Gulf port calls, by simply adding extra vessels - though with evident cost implications. However, what could not be changed would be the longer transit time for cargoes originating, for example, in the Far East and destined (say) for Europe, if vessels made additional time-consuming calls in the Persian Gulf. This type of factor must necessarily reduce the scope for additional direct calls and increase the scope for trans-shipment.

95. Important as the development of trans-shipment and the concentration of main line container vessel calls have been on some container ship services to the Persian Gulf, such developments are by no means universal and there are other services where trans-shipment has been less prominent. For instance, where a regionally owned line such as the United Arab Shipping Corporation (UASC) is involved, its multinational (in the sense of "multi-State") ownership will be likely to increase its interest in serving more of the ports in the owning States by direct call. Operating in consortium with foreign lines, e.g. from Europe, UASC and its consortium partners have a sufficient volume of traffic to justify calling frequently at ports in several Gulf States, and this with container vessels of approximately 1,800-1,900 TEU. The main Gulf ports of call on this particular service are Dubai (Mina Rashid) Abu Dhabi, Bahrain and Kuwait, and vessels also discharge at Dammam and load at Jubail.

96. Cargo considerations may also encourage the making of more direct calls than might otherwise be the case. This applies, for instance, to an operator such as Blue Star Line, whose vessels call at Mina Qaboos, Dubai (Mina Rashid), Bahrain, Dammam and Kuwait; Blue Star discharges substantial volumes of refrigerated cargo such as frozen meat, and trans-shipment in Gulf temperatures may not be attractive.

97. Where it is feasible, overland road trans-shipment may take place. Containerized Qatar traffic is partly transported by road through the United Arab Emirates, but also partly moved directly through the Qatari port of Doha. Substantial volumes of containerized Iraqi cargo have been trans-shipped by road, e.g. through the port of Kuwait.

98. Initially, the development of trans-shipment led to the introduction of dedicated feeder services in (and connecting into) the Persian Gulf. However, the growth of traffic led to the increasing development of common user services. The fact that in the Persian Gulf these services were developed on a competitive basis and so with commercially attractive freight rates made it less and less necessary for the main line container service operators also to have dedicated feeder services. This development has perhaps been especially marked in Dubai, where there is good availability of common user services with a range of vessels, typically varying in size from below 100 TEU to about 600-700 TEU. In one particular trans-shipment trade to and from the Islamic Republic of Iran, with the exception only of a Maersk vessel all other feeder vessels are common user.

99. Some feeder services are purely local, e.g. between Dubai and Bandar Abbas, some are regional, operating broadly within the Persian Gulf, e.g. Norasia operate a dedicated 500 TEU vessel, the Norasia Attica, between Dubai, Sharjah, Abu Dhabi, Bahrain, Kuwait and Mina Qaboos. By contrast, various other operators have services on a regionally more widespread basis e.g. Colombo, Fujairah, Karachi, Colombo rotation. It is partly a matter of semantics as to what constitutes a "feeder" as against a regional carrier, but another line of one type or the other with trans-shipment relevance connects Dubai, Dammam, Kuwait, Mina Qaboos, Bombay, Kandla and Karachi. There are also lines linking the Persian Gulf with the Red Sea and neighbouring areas, e.g. a roll-on/roll-off service linking Dubai, Bahrain, Dammam, Kuwait, Mina Qaboos, Mina Raysut (Salalah), Aqaba, Aden, Hodeidah and Port Sudan (the various services described above are mentioned purely in an illustrative sense and do not constitute a comprehensive listing of feeder services).

100. It is evident that different lines have different policies as regards the extent of feeder service and as regards the quantity of cargo and the percentage of cargo on board required to justify a vessel making direct calls at a port. In the Persian Gulf context, one company operating 1,200 TEU vessels would estimate, as an approximation a minimum cargo requirement to justify a direct call of about 200 TEU; another operator, with larger vessels, would estimate, again as an approximation, a direct call requirement of somewhere in the region 600-700 TEU. The sheer range of these estimates is an indication of the variability in the factors determining whether an operator decides to feeder a port or to call direct.

101. In this region, important port investments are being made (or planned) to cope with anticipated traffic increase. For instance, it has been announced that Abu Dhabi has invested \$US 36 million in extending the capacity of the port of Zayed. ^{13/} Bahrain would also plan to develop a "Gulf Superport". ^{14/} In an attempt to show how difficult it is to establish traffic forecastings in this field, the table below has been produced. ^{15/} It shows that, essentially because of the impact of intra-regional and extra-regional trans-shipment activities, sharp traffic increases or decreases can be observed in some ports.

		1985 (TEU)	1988 (TEU)
Kuwait	Shuaiba	106 649	102 743
	Shuwaikh	129 144	111 410
Oman	Mina Qaboos	111 596	147 882
Saudi Arabia	Dammam	253 288	208 278
Bahrain	Mina Sulman	104 081	66 794
United Arab Emirates	Port Zayed (Abu Dhabi)	25 633	42 693
	Jebel Ali (Dubai)	144 693	210 360
	Port Rachid (Dubai)	371 632	557 521
	Fujairah (Fujairah)	82 553	202 893
	Kor Fakkan (Sharjah)	-	124 224
	Port Khalid (Sharjah)	36 784	45 476

Red Sea

102. In the Red Sea region, a considerable number of container shipping routes are funnelled together in a relatively confined area, and this factor naturally could give rise to inter-line trans-shipment, as defined in chapter II. Furthermore, very substantial port facilities exist: this is a consequence of the existence of major national traffic flows, but it could also provide scope for the development of trans-shipment. In practice, inter-line trans-shipment has not as yet developed on a substantial scale, but opportunities for the development of such trans-shipment do exist. Somewhat similarly, there has as yet been only relatively limited development of local or regional trans-shipment.

103. The reasons for this are complex. In some cases, shipowners have considered interlining at a Red Sea port but have declined to do so after analysing the utilization of their existing fleets (finding, for example, that it would lead to a requirement for additional tonnage, which would be under-utilized except for that part of vessel itineraries on which the trans-shipped cargo would be carried). Commercial considerations, e.g. the potentially conflicting interests of different shipping operators, have held back the development of interlining at otherwise potentially attractive locations. Furthermore, in the past, there have been instances where cargo interests have not favoured trans-shipment. Apart from this, government policies in the Red Sea region have not always necessarily favoured the development of trans-shipment.

104. This situation is changing. It is worth underlining the efforts (and investments) made in Aden, Djibouti, Jeddah and Port Sudan to handle container traffic and attract trans-shipment traffic. The port of Djibouti has been particularly active in promoting its new trans-shipment facilities (2 berths, 12 m of water, 2 gantry cranes), organizing recently a commercial campaign in Europe headed by its Prime Minister. This is a good example of a country with very limited hinterland trade which is willing to play a role as a dedicated trans-shipment port, as defined in chapter II. The traffic is still limited (28,437 TEU in 1988), but some important shipowners have already selected Djibouti for their trans-shipment activities, either interlining (e.g. Capricorne, CMB, Lloyd Triestino Messina, Beacon) or scattering/feederling.

105. The port of Aden is investing \$60 million for the modernization of its facilities, which have been designed also to attract trans-shipment traffic. The modern container terminal of the port of Jeddah is a direct call port for most of the major line-haul services (Evergreen, Sea land, Nedlloyd, Maersk, APL, CGM etc.). Interlining trans-shipment is done between the Europe-Far East lines of ScanDutch and Trio and the Australia-New Zealand line of Anzeccs.

Europe

106. The present study is chiefly concerned with the ports and trades of the developing countries. It was nevertheless thought worthwhile to supply some information about trans-shipment in Europe, for it has developed on an extensive scale and there are lessons to be drawn from it which may be of use to the developing countries. All the kinds of trans-shipment described in chapter II are to be found taking place in Europe.

1. Container traffic in Europe

107. Total traffic in and out of European ports has developed as follows:

12.5 MTEU in 1982	16/
14.5 MTEU in 1984	
15.0 MTEU in 1985	
16.5 MTEU in 1986	
18.4 MTEU in 1987	

If this development is compared with that of world-wide traffic, i.e.:

42.3 MTEU in 1982
54.3 MTEU in 1984
55.8 MTEU in 1985
59.4 MTEU in 1986
65.8 MTEU in 1987

it will be seen that Europe's share of world container traffic has declined somewhat. This is due partly to the development of container transport in developing countries and particularly in the countries of South-East Asia.

108. According to a study carried out by Containerisation International in 1982 and updated in 1986, in the latter year European traffic was made up of:

10.4 million TEU in traffic with ports outside Europe

6.1 million TEU in purely European traffic.

The 6.1 MTEU of purely European traffic was composed of 63 per cent inter-European trade and 37 per cent feeder traffic. In 1982 the proportion of feeder traffic was only 30 per cent; it has thus increased, and the rising trend continues to this day.

2. Feeder traffic in northern Europe

109. The main flows of feeder traffic in northern Europe start from the great continental ports on the North Sea - Rotterdam, Antwerp, etc. - and the Channel to serve:

- the British Isles at Felixstowe, Tilbury, Southampton, Glasgow, Dublin and Cork, with 0.6 MTEU carried;
- Scandinavia, chiefly from ports in the Federal Republic of Germany with 0.14 MTEU carried;
- the Iberian peninsula at Bilbao, Santander and Pasajes in northern Spain, Vigo in Spain, Lisbon and Leixoes in Portugal, and beyond to Gibraltar, Morocco and the Canary Islands, with 0.04 MTEU carried;
- to a lesser extent, the east Baltic at Rostock in the German Democratic Republic, Gdynia in Poland, Leningrad and Riga in the USSR, mainly from ports in the Federal Republic of Germany.

The area-by-area analysis brings out the importance of the cross-Channel link between the United Kingdom and the Continent, which accounts for 25 per cent of European moves.

110. The main imbalances in trade in Europe affect the Iberian peninsula, which is mainly an exporter, and the group composed of the United Kingdom and Ireland, which is mainly an importer. Keen competition has set in between the big ports in northern Europe for the status of hub port, particularly in view of the prospective reduction in the number of calls made by transoceanic lines in this area which is dictated by the trend towards giant container ships and the need to reduce transit times.

111. Feeder traffic in northern Europe is carried on mainly by the many coastal shipping companies, which vary in degree of specialization according to the routes they serve and which also carry inter-European cargo. The big liner companies such as Maersk and Sealand prefer to do their own feeder traffic in Europe either directly or through subsidiaries, transshipping their containers at the ports of Rotterdam and Algeciras. They do not, however, decline to undertake in addition the inter-European cabotage trade in order to operate their feeder ships more profitably.

3. Feederling in the Mediterranean

112. Total traffic in and out of the European ports in the Mediterranean area in 1986 amounted to:

3.37 MTEU

including 0.77 MTEU of European traffic

and 2.60 MTEU in extra-European traffic.

113. French ports (chiefly Fos) accounted for 0.495 MTEU, Italian ports (Genoa, Leghorn, La Spezia and to a lesser extent Naples, Salerno and Trieste) for 1.52 MTEU and Spanish ports (Barcelona, Valencia and Algeciras in particular) for 1 MTEU.

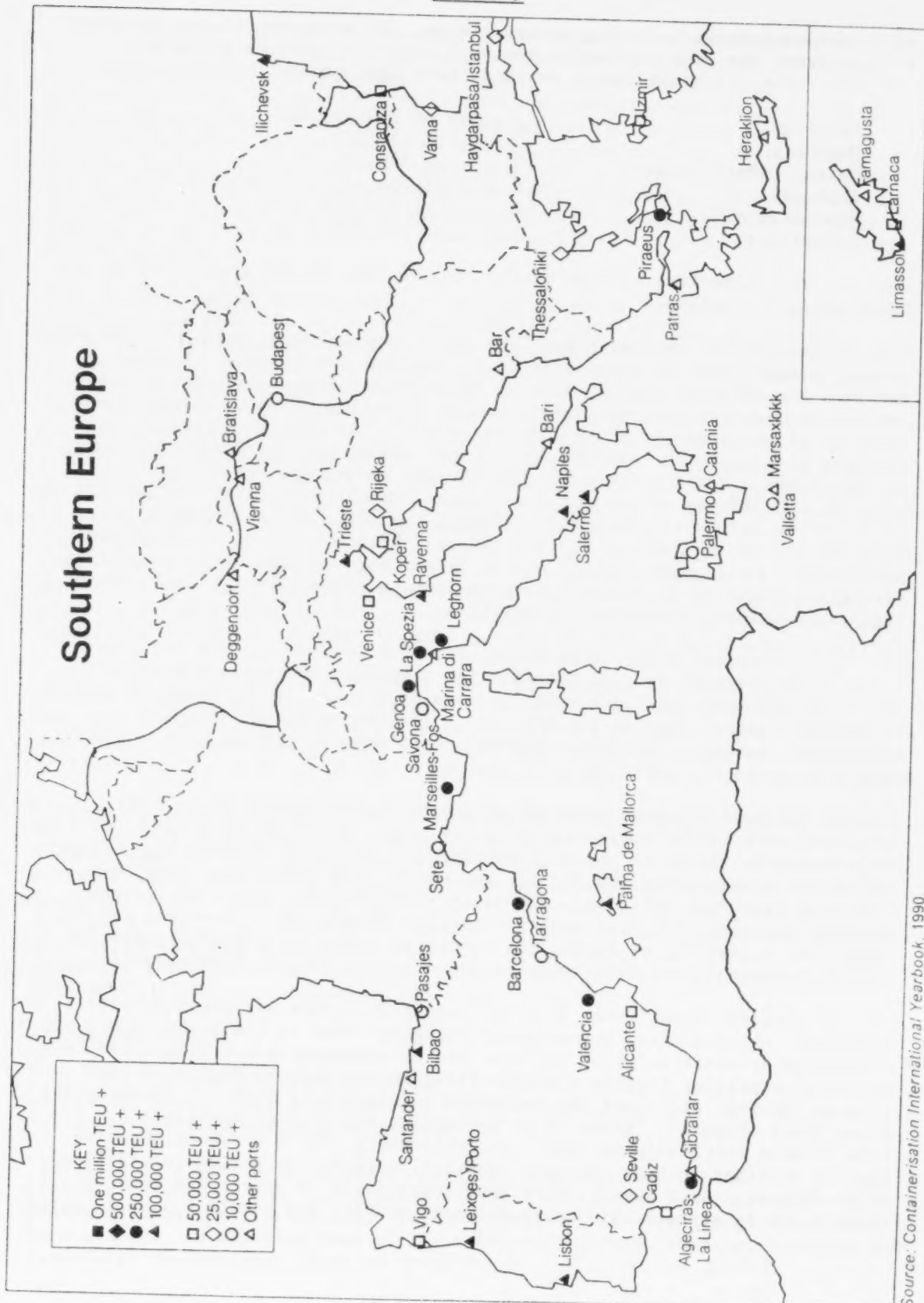
114. The European traffic of the Mediterranean area, with 0.77 MTEU, was already large, for it represented 13 per cent of the total traffic of the European ports. Feeder traffic then represented 64 per cent of the total, or almost 0.50 MTEU. It is of interest to note that the Mediterranean area has exhibited the highest relative growth rate in Europe, with a share of European traffic that increased from 7 per cent in 1982 to 13 per cent in 1986. Trans-shipment traffic has grown steadily since then, as will be seen in the paragraphs which follow.

115. For the big shipowners operating as independent lines or in a consortium, the Mediterranean area affords access to southern Europe and the Middle East, and indirectly to the Maghreb, Africa and the Persian Gulf. It is also traversed by Europe-Far East routes and round-the-world routes. The main ports of call are situated in the north-western Mediterranean (Marseilles/Fos, Algeciras, Valencia, Barcelona, Genoa, Leghorn and La Spezia). Elsewhere, Cyprus (Limassol and Larnaca), Malta (Marsaxlokk) and Greece (Piraeus) have gained status as important trans-shipment ports.

116. With approximately 100,000 TEU of traffic, trans-shipment accounts for some 20 per cent of the throughput of Marseilles-Fos. This port has undertaken large-scale investments (offering a guaranteed draught of 14 metres) and its highly competitive rates and improved reliability have enabled it to attract some big shipping concerns: US Lines a few years ago, ScanDutch today. When labour disputes have broken out in other Mediterranean ports, Maersk and other shipping lines have switched to Fos, which serves Spain, Morocco, Portugal, the western Mediterranean and Italy with feeders. It facilitates interlining between United States-Far East routes and those to the Maghreb and West Africa. There are no long-term concessions; all the facilities, including the gantry cranes, belong to the port. Mobile equipment is supplied by the operators.

117. At Algeciras, which is the very model of a dedicated trans-shipment port, three container terminals have been commissioned (those of Sealand, Maersk and Terminales de Algeciras SA); each operator has financed the development of

Figure 3



Source: Containerisation International Yearbook, 1990.

yards and equipment, including gantry cranes. An extension of the container storage areas has been granted by the port authority under a three-year contract. The following feeder services have been brought into operation:

Canaries:	3 ships of 130/150 TEU
Morocco:	1 ship of 130 TEU
Valencia/Barcelona:	1 ship of 570 TEU
Portugal:	1 ship of 780 and 1 of 160 TEU
West Africa:	2 ships of 800 TEU
Marseilles:	1 ship of 400 TEU.

118. In 1989, Algeciras handled nearly 400,000 TEU, 90 per cent of which was trans-shipment traffic.

119. In the Central Mediterranean, the main trans-shipment ports are the Greek port of Piraeus and the Cypriot ports of Limassol and Larnaca. Larnaca receives the ships of the DSR Line on the northern Europe-Asia route and serves the Mediterranean area with feeders belonging to DSR; trans-shipment trade is of the order of 80,000 TEU per annum. The port of Limassol receives the ScanDutch Line (60,000 TEU per annum) and its feeder services to the northern Mediterranean (60,000 TEU per annum) and the Evergreen Line (40,000 TEU per annum) and its feeders, which serve Egypt (40,000 TEU per annum). Two thirds of the traffic through the port, which increased from 140,000 TEU in 1987 to 221,000 TEU in 1989, consists of trans-shipment operations. These ports, which are no better endowed than their competitors (draught limited to 11 metres), have managed to win and keep a large amount of traffic by offering high-quality services.

120. Malta receives Hapag Lloyd ships bound for Indonesia. The container terminal is operated by a Maltese/British company. The press recently announced ^{17/} that this port would be used by Norasia, which formerly called at Piraeus (annual traffic 100,000 TEU). The facilities at this port, essentially designed for trans-shipment, cost some \$US 200 million and have long been under-utilized. ^{18/}

121. On the Mediterranean coast of Africa containerization has not yet developed very far by comparison with the total volume of cargo that could be containerized. Egypt is the only country with a port - Alexandria - having a throughput of more than 100,000 TEU per annum. The investment Egypt has channeled into Port Saïd, and especially into Damietta, which has a vast terminal equipped with four gantry cranes, a draught of 14.5 metres and vast yards with a capacity of 2,600 TEU, demonstrate an understandable ambition to develop trans-shipment operations in the direction of the Middle East.

122. The Mediterranean area, like north-western Europe, is propitious to feedering, which enables transoceanic shipping lines to limit the number of calls made by their ships in the area and to serve ports carrying a limited amount of container traffic - particularly in the eastern Mediterranean (Greece, Turkey, etc.) and the Maghreb - indirectly by means of feeder ships after trans-shipment. There is at present no predestined candidate for the role of main trans-shipment port; the shipowners choose a French, Spanish, Italian or other port as the case requires, unless they decide to practise multi-calling. As a result, very keen competition is developing between all these ports to attract this trans-shipment traffic and attain hub port status.

123. An important feature of the area is the highly unbalanced nature of traffic affecting the Red Sea and the Persian Gulf; a great many containers come away empty from these areas. A call at a Mediterranean port on the return leg of the journey to load up with South-North inter-European freight (mainly agricultural produce) saves the high cost of bringing back these containers empty. Another solution lies in relocation, i.e. in combining service to the Gulf - an area of unbalanced westward trade - with service to the Far East - an area with a demand for empty containers. This was one of the considerations which led to the agreements to co-ordinate the services of Sealand to the Persian Gulf and the Indian subcontinent with those of Norasia to the Far East.

124. Mention should also be made of the situation of competition between the Mediterranean area and the north European area to serve Europe, and in particular for trades to the Far East. Despite a difference in sea distance of the order of 1,800 miles, the development of traffic between Europe and the Far East appears for the time being as profitable to the ports of northern Europe as to those of the Mediterranean, if not more profitable. Thus the big ports of northern Europe such as Rotterdam, Antwerp and Le Havre continue intensive service to areas of southern Europe which might a priori have been considered captive to Mediterranean ports: the Rhône-Alps area, Switzerland, the Po Basin, Bavaria, etc. The outcome of the competition which is benefiting these areas will depend on several factors including, in particular, the quality of the facilities and the services rendered, especially when very large volumes of traffic are to be handled; the possibility of amortizing the necessary investments over a larger volume of their own traffic, which would make it possible to apply a competitive tariff policy, especially for trans-shipment trades; and the quality of the social climate.

125. It is of interest to note that some land bridges have been established between northern and southern Europe by large shipping lines such as CGM so that the cargo needed to fill the ships on the two routes brought into operation under the auspices of ScanDutch from northern Europe and the Mediterranean to Asia can be sent North-South and vice versa according to need.

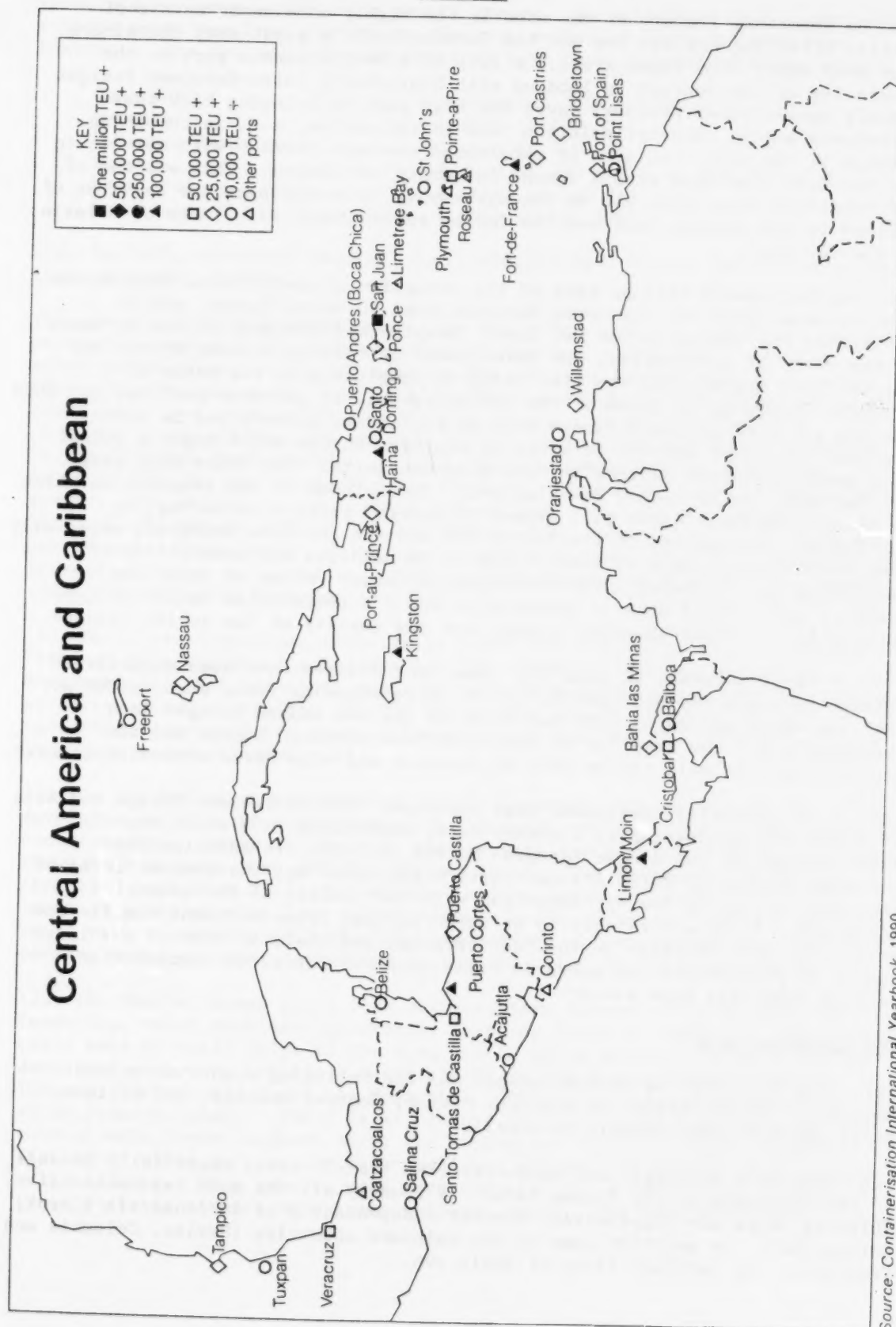
126. It is generally considered that container traffic between Europe and Asia will continue to develop at a steady rate, especially in view of the establishment of the Single European Market in 1993. In addition the containerization of North African ports might speed up; the present level of containerization is low by comparison with the traffic of the countries concerned. It is accordingly to be expected that trans-shipment traffic and activities will increase in the Mediterranean and that, in view of the large number of ports which can serve as trans-shipment ports, the competition between them will grow keener.

The Caribbean area

127. This includes the islands proper and the following countries on the mainland: United States of America, Mexico, Central America, and northern South America from Colombia to Brazil.

128. This is a strategic and much-travelled transit area, essentially because of the existence of the Panama Canal. Virtually all the main international shipping lines are represented, whether independently or in consortia (Carol, Eurocaribe). In addition some of the mainland countries (Mexico, Colombia and Venezuela) run national lines of their own.

Figure 4



129. The area is particularly well suited to "scattering" trans-shipment in view of the large number of small ports to be served, where the facilities are sometimes rudimentary but sufficient to allow small roll-on/roll-off vessels to unload their cargo. The area also lends itself to inter-line trans-shipment between services from Europe or the Far East and North-South services linking the two American subcontinents.

130. Feederling (cabotage) between the islands is provided either by the big shipping lines (Sealand, Zim, Nedlloyd, GCM, etc.) or by shipowners of the region (Wisco, línea AGROMAR, etc.). The region is well covered by a score of shipping companies in all.

131. Table 1 gives a description of the main shipping lines performing trans-shipment operations. Direct-call ports, trans-shipment ports, those served by trans-shipment and occasional ports of call are shown.

132. The main ports which have gained the status of trans-shipment ports in the region are the following:

- Miami, Florida, where 18 per cent of the traffic is trans-shipment (207,000 TEU of traffic in 1988) and which occupies a central position in relation to the American East Coast and Gulf ports on the one hand and South America on the other. This highly efficient port receives such a concentration of North-South traffic (ships with an average capacity of 1,000 TEU) as to make it an ideal port of interconnection with East-West routes, particularly from Europe, inasmuch as freight rates to Miami are well below the direct freight rate governed by the WITASS Conference. The Maersk Line has made Miami its trans-shipment hub both for traffic bound for Europe and for that bound for the Far East. Port Everglades (222,000 TEU in 1988) also plays an important part as a trans-shipment port for the Caribbean;
- San Juan, Puerto Rico, which handled 664,166 TEU of container traffic in 1988, and Ponce (38,309 TEU in 1988);
- Kingston, Jamaica, with 110,000 TEU of traffic in 1988 (as compared with 138,000 TEU in 1986); the port is well situated and has made efforts to invest in marketing and market operations in order to win a share of the region's trans-shipment traffic. The container terminal is operated by a company on behalf of the port authority;
- Cristóbal, Panama, which has the advantage of being on the route of ocean-going vessels using the Canal but is nevertheless somewhat off-centre and more suitable for trans-shipping cargo bound for Central America and the West Coast. Its throughput fell from 128,000 TEU in 1987 to 82,000 TEU in 1988, and it appears that the port was abandoned by a big shipping line after the discovery of illicit traffic;

Table 1

D = Direct-call + trans-shipment port	
T = Port served by trans-shipment	
DT = Either direct or trans-shipment	
O = Occasional call	
Line	
Sector No. 1 - Europe	
Atl.	
Atlantic	
USA: East Coast	
USA: Gulf	
Miami	
Port Everglades	
Belize City	
Santo Tomas de Castilla	
Puerto Cortes	
Puerto Limon	
Cristobal	
Cartagena	
Barranquilla	
Santa Maria	
Aruba	
Curaçao: Willemstad	
Kingston	
Grand Cayman: George Town	
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Santo Domingo	
San Juan de Puerto Rico	
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St. Lucia	
Antigua	
Grenada	
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Port of Spain	
St. Vincent	
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Maracasibo	
Puerto Cabello	
La Guaira	
Parararibo	

Table 1 (continued)

Lines	Remarks	Atlantic	Caribbean	Indian Ocean	Pacific	Arctic	Antarctic	Other
Sector No. 2 (North-South)								
Calypso								
Crawley								
TMT								
CCT								
Linea Maritima								
Navieras de Pr.								
Saguenay								
Sea-Barge								
Tecumseh								
Transcaribe								
Wisco								
Sector No. 3 Nil								
Sector No. 4								
South America East/West								
CSAV								
Sector No. 5								
Far East/Australia								
Columbus								
USA: East Coast								
USA: Gulf								
Miami								
Port Everglades								
Belize City								
Santo Tomas de Castilla								
Puerto Cortes								
Puerto Limon								
Cristobal								
Cartagena								
Barranquilla								
Santa Maria								
Aruba								
Curaçao Willemstad								
Kingsport								
Grand Cayman George Town								
Port au Prince								
Rio de Janeiro								
Santo Domingo								
San Juan de Puerto Rico								
Ponce								
Anguilla								
St. Thomas								
St. Croix								
St. Martin								
Saint Barthélemy								
Pointe-à-Pitre								
Port de France								
Montserrat								
St. Lucia								
Antigua								
Greenada								
Port of Spain								
St. Vincent								
St. Kitts								
Maracasibo								
Puerto Cabello								
La Guaira								
Paramaribo								
Dégrad des Cannes								
Georgetown								
Northern Brazil								
Atlantic								

D = Direct-call +
trans-shipment port
T = Port served by
trans-shipment
O = Occasional call

T On request

D = Hub

T possible to Lesser Antilles
T possible to Lesser Antilles

Table 1 (continued)

D = Direct-call +
trans-shipment port

T = Port served by
trans-shipment

O = Occasional call

Source: Chamber of Commerce and Industry of Martinique: General study of transfer of container terminal to Pointe de Grives. Study prepared by the Autonomous Port of Le Havre.

- The ports of Pointe-à-Pitre, Guadeloupe, which has strengthened its potential by establishing a free port zone and which has a gantry crane for "over-Panamax" traffic (93,000 TEU in 1988); and Fort de France, Martinique, which, with 98,000 TEU of traffic in 1988, has been classified eighth port of Latin America and the Caribbean by Containerization International.

133. The arrival of "over-Panamax" ships on the Atlantic routes hints at the following developments in the next few years:

- Even greater concentration in consortia, perhaps accompanied by strengthening of, for example, the Europe-Miami axis and increased feedering of Central America and of South America, particularly its western and northern coasts;
- Perhaps the establishment of a land bridge in Central America. The big shipping lines are exploring this possibility with the local authorities (e.g. Evergreen in Costa Rica);
- Increased competition between ports for the role of trans-shipment port.

134. In this area, ports seeking trans-shipment port status will need to guarantee political and social stability as well as the normal technical capabilities and efficiency; they will also have to guard against the inroads of illicit (i.e. drug) traffic.

South America

135. Containerization has not developed significantly in South America, as will be seen from figures 5.

136. There seem to be several reasons for this: little investment in specialized port facilities, a legal order that restricts cargoes to national fleets, trade union resistance to more labour-saving technologies, and geographical remoteness from the main international trade routes.

137. As a result, trans-shipment is not a large-scale activity at South American ports. There are, however, a few exceptions. Thus, Nedlloyd has, since June 1989, been using Puerto Quetzal, a new port in Guatemala, for trans-shipment operations from its motherships out of Asia on to feeder vessels serving the west coast of North and South America. This traffic totals 3,000 TEU a month.

138. Trans-shipment is also practised at Caribbean and United States ports, on goods shipped from and to South American countries such as Brazil, Argentina and Chile. For example, the Compañía Chilena de Navegación Interoceánica (CCNI) has a "connecting carrier agreement" with Sealand that allows it to make an inter-line trans-shipment at New York. It has established a joint monthly service with the Compañía Sudamericana de Vapores (CSAV) linking Chilean ports with Singapore and Papeete, with trans-shipment for South-East Asia and for Australia and New Zealand respectively.

Figure 5



Source: *Containerisation International Yearbook*, 1990.

139. On the east coast, Hapag Lloyd uses Manaus (Brazil) for its trans-shipment operations en route to Iquitos (Peru), and American President Lines trans-ships its cargoes for Asunción (Paraguay) at Buenos Aires. In Chile a feeder service has been established between Valparaiso and Punta Arenas.

140. It is worth noting that several shipping companies in South America (Chile, Argentina, Colombia, Peru, etc.) which have a long tradition and a wealth of shipping experience have managed to adapt their operating and development strategy so as to be associated with the changes made by the big transoceanic lines. We may mention as examples participation in such consortia as Eurosal or agreements of the following kinds:

- Slot charter or exchange agreements;
- Joint operating agreements;
- Connecting carrier agreements.

141. In addition, the trend is towards the development of trade and of shipping co-operation within the region. Goods coming from north-western Argentina are loaded at Chilean ports, and there are projects under consideration to give Bolivia an opening to the Pacific at Matarani and to improve service to Paraguay via the River Plate. The Economic Commission for Latin America and the Caribbean (ECLAC) is working to develop multimodal transport. The ports are fitting themselves out. In time to come, it might become possible to serve the east coast of South America, especially Brazil and Argentina, from Europe and North America wholly or partly without feeder services, for the volume of traffic is sufficient for direct service to be an economic proposition (using ships of more than 2,000 TEU) at an acceptable frequency (every 10 days).

142. It should be remembered that Brazil, whose traffic totalled 815,000 TEU in 1988, or 20 per cent more than in 1987, now ranks twentieth among the world's countries in order of volume of container traffic. ^{19/} Argentina ranks fortieth with nearly 200,000 TEU. It might thus be possible to have a mesh in the world network extending along the east coast and connected through interlining ports with the Caribbean-North America-Europe network, with one or two hub ports in South America, feedered scatter traffic to secondary ports in the area and perhaps, if South-South trade develops, a branch line to Africa.

143. For the west coast, which is at present served mainly by the Eurosal consortium, there is already a *de facto* feedering system under agreements reached by local shipowners with the big oceanic shipping lines. In the absence of sufficient indigenous traffic, this system might grow on the basis of the ports of the North America/Central America network.

West and Central Africa

144. On the Atlantic coast of North Africa, which is very close to the main Asia-Europe sea routes, trans-shipment activities are taking shape. Thus some 2,000 containers a year leave ports in Southern Morocco on board feeder vessels bound directly for Algeciras, where they are trans-shipped into ocean-going container ships. In the past this cargo was routed through the

Figure 6



Source: Containerisation International Yearbook, 1990.

port of Casablanca, where it was loaded into local shipowners' vessels. This port, which has successfully undergone drastic reorganization, 20/ is to expand its container terminal (80,000 TEU in 1987), since the country's own traffic points to an increase in the use of containers.

145. Two ports in the Canary Islands, Las Palmas and Santa Cruz de Tenerife, have good facilities to offer: gantry cranes and a draught of 12 m and 14 m respectively. The flow of traffic at each of these ports has passed the 150,000 TEU mark. The authorities hope to develop trans-shipment activities which ZIM began organizing in 1981 using Las Palmas as the interlining port for ZIM services to South America, Europe and West Africa. After a year's trial, the experiment was discontinued for lack of sufficient traffic. 21/

146. The coasts of West and Central Africa are studded with a succession of ports to be served, virtually at the rate of one port per country; in most cases the port is also the capital. Container traffic has developed on a significant scale and sometimes represents a high proportion of the traffic without being large in absolute terms.

147. With a few exceptions such as Abidjan and Lagos, these ports have no gantry cranes to handle containers, with the result that loading and unloading speeds fall short of international standards. In some cases there are constraints of draught and of maximum ship length - very often imposed by the available turning areas - which limit access to container ships of not more than 1,600-1,800 TEU.

148. The port of Abidjan has a container terminal with 800 m of quay and a draught of 12.50 m. It is equipped with two 40-ton gantry cranes. It carried a large amount of trans-shipment traffic in 1981-1982, when Nigerian ports were crowded (24,184 TEU 22/, in 1981, 22,215 TEU in 1982). The present rate of trans-shipment is 7,000 TEU per annum, as compared with a total traffic which increased from 178,973 TEU in 1988 to 207,827 TEU in 1989. This port also handles traffic in transit to Burkina Faso (3,326 TEU in 1989) and Mali (1,074 TEU in 1989).

149. The port of Dakar inaugurated a new container terminal in 1988. This has 430 m of quay and a draught of 11.40 m. The traffic throughput was 71,000 TEU 23/ in 1989, including some in transit to Mali (3,107 TEU in 1988 and 3,953 TEU in 1989). The port's geographical position has long given it a role in the trans-shipment of general cargo for neighbouring countries, especially Mauritania. The feasibility of instituting a feeder service to the Gambia, Conakry and Guinea-Bissau is being explored. The Lagos/Apapa terminal in Nigeria (1,005 m, 11.5 m of draught) is equipped with two gantry cranes. Total traffic through Lagos/Apapa increased from 145,192 TEU in 1987 to 155,508 TEU in 1988. At Douala (Cameroon) the traffic through the container terminal (200 m, 11.5 m of draught) has decreased slightly (from 91,337 TEU in 1983 to 84,239 TEU in 1988).

150. Trans-shipment has not developed on any great scale in this region for the following reasons:

- The area is away from the main flows of transoceanic traffic;
- The traffic is insufficient and the port not well enough equipped to attract big ocean-going container ships;

- The constraints of commercial competition have caused shipowners to favour direct transport;
- The cargo reservation systems instituted at the national level impart a rigidity ill-suited to trans-shipment operations;
- National shipping lines have specialized in operating direct-line services and would be unwilling to switch to feeder services.

151. Feederings is not, however, absent altogether. Thus Delmas Vieljeux serves the port of Matadi by feeder from Pointe Noire, since sailing conditions do not permit direct access. Maersk serves the area from its Algeciras hub.

152. Many ports in the region, from the Canaries through Cape Verde, Dakar, Abidjan, Lagos, Pointe Noire and Douala, are in hopes of developing trans-shipment operations and are preparing for this. However, the big shipping lines represented in the region have not yet lived up to these expectations. It has indeed been stated that Hoegh, Woerman and Nedlloyd might cease making calls at ports beyond Douala and might feeder the ports further south, ^{24/} but it is open to question whether they will actually do so. The press ^{25/} recently reported the restructuring of the CMB container services. The ships, which carry about 1,200 TEU, will be operated on the northern Europe-West and Central Africa route, with direct calls at the main ports in the Dakar-Douala range.

153. If a minimum of agreement is reached between shipping lines on combining and carrying their freight, a limited degree of feederings might develop in order to reduce the high costs incurred by having the ships call at the port, but there is not enough traffic to warrant any hope of attracting very large container ships. There is also a distinct possibility that the feederings already organized from Algeciras to Dakar will develop on a larger scale if agreements are reached with local shipowners.

East Africa

154. The expression "East Africa" is used here to mean the East African coast from the Horn to South Africa and the Indian Ocean islands: Madagascar, Reunion, the Seychelles and Mauritius.

155. Maritime trans-shipment has not developed very far in this area; it represents some 5-10 per cent of total traffic.

156. The limitations of the ports and of the traffic volume have so far kept out third-generation container vessels; with the exception of the Red Sea, which is traversed by such ships, usually en route to the Far East, this area is frequented mainly by ships in the 12,000 TEU class.

157. Scatter feederings has nevertheless developed to serve very small and relatively inaccessible ports, and the same applies to inter-line trans-shipment as a means of pooling and thus extending service to ports in the area.

158. Apart from the Red Sea ports which have already been considered, the main ports suitable for trans-shipment traffic are the following:

In the Indian Ocean:

- Pointe des Galets on Reunion: This port has no gantry cranes but is a deep-water port well sited in the centre of the area and entails no diversion for lines running from the Far East to South Africa. Its traffic increased from 20,000 TEU in 1985 to 37,000 TEU in 1989. 26/ Some big shipping lines make calls there (either direct calls or trans-shipments); these are Capricorne, Chargeurs Delmas, Nedlloyds and MSC, which use Durban and Antwerp as inter-line trans-shipment ports. This country has the advantage of a traffic which is well balanced between inward and outward movements;
- Port Louis (Mauritius): This port carried 53,375 TEU in 1988 and proposes to develop a free zone in order to strengthen its trans-shipment potential. Mitsui uses it for trans-shipment to Reunion and the Seychelles.

On the East African coast:

- Mombasa (129,000 TEU 27/ in 1988), which has a container terminal with a draught of 11 m, is equipped with three gantry cranes and performs trans-shipment operations for other ports on the coast, especially towards Mozambique and Tanzania. In 1988 trans-shipment represented 4,674 TEU out of a total traffic of 111,445 TEU;
- Dar es Salaam (61,943 TEU in 1988). The port is equipped with two gantry cranes. It has embarked on a programme to develop its container reception facilities. Like Mombasa it is a port of direct call for big shipping lines with trans-shipment for Nacala (Beacon). Maersk links Mombasa and Dar es Salaam to northern Europe with trans-shipment at Algeciras;
- Maputo (throughput 8,900 TEU in 1988) also has a container terminal equipped with two gantry cranes. Beira is less well equipped but handled 15,279 TEU in 1988;
- Durban in South Africa, an efficient port which handles a heavy flow of South Africa's own traffic in partnership with Cape Town. Its traffic increased from 408,564 TEU in 1987 to 477,298 TEU in 1988. It is an important hub and load-centre port.

159. Although this region has only limited container traffic of its own, its geographical situation is less remote than that of West Africa. Many big shipping lines are represented, for example:

- The JCS consortium, which serves the Middle East and, since absorbing Cobra, has been serving the Indian sub-continent from Europe;
- The Capricorne consortium, which serves the Indian Ocean from Europe;
- The Beacon consortium, which serves the East African coast, especially Mombasa, from Europe;

- NCHP, a French line, which links the Far East with Durban via Reunion;
- Nedlloyd, a Dutch line, which links the Far East with Africa by its Southern Round-the-World Service;
- Chargeurs Réunis, a French line, in a consortium with the Japanese Mosk and K Line, which also links the Far East with West Africa and serves the Indian Ocean en route,

not to mention all the "round-the-world" lines and lines to the Persian Gulf or the Far East.

160. The main direct-call ports seem to have been determined; the size of ships operated on these routes is increasing (CMB announces 2,000 TEU). A scatter trans-shipment traffic might, however, develop pari passu with the trade of the countries and islands not directly served, such as Madagascar.

IV. FORESEEABLE DEVELOPMENT OF THE ROLES AND STRATEGIES OF THE MAIN ACTIVE PARTIES

1. Introduction

161. In the region-by-region survey above, some indication was given of the regional prospects for the development of trans-shipment activities. For the world as a whole, the Containerisation International Yearbook, 1990, shows that container traffic through all ports totalled 73 million TEU in 1988, or 10.6 per cent more than in 1987 (after increasing 9.8 per cent in 1987 and 8.6 per cent in 1986). Ports in 18 countries and territories, including Taiwan Province of China, Hong Kong, Singapore, the Republic of Korea, the Philippines and the United Arab Emirates, passed the 1 million TEU per annum mark. Forecasters agree that the foreseeable development in the next few years will be at a slower pace, especially on certain routes (Europe-United States), whereas a steady growth rate (7.7 per cent) should be maintained on others (Europe-Asia).

162. Some writers considers that the process of concentration which has already begun with the existence of megahub ports on certain trades will intensify and be accompanied by a further increase in ship size on certain heavily travelled routes. This has led them to suggest the following global scenario, which is worthy of mention more for its general conception than for the details of its application: 6,000 TEU ships on the California, Japan, Taiwan Province of China, Hong Kong, Singapore, Colombo, Suez Canal, Algeciras/Lisbon, Northern Europe route; 2,000 TEU feeders connecting the East Coast of the United States with Algeciras/Lisbon; these last also linked by smaller feeders with West Africa, the east coast of South America and the western Mediterranean, with Port Said serving as trans-shipment port for the eastern Mediterranean and Djedda and Colombo doing so for the Middle East and the Indian Ocean respectively, while Singapore would be the only trans-shipment port for the whole of South-East Asia. 28/ Others, in contrast, predict an increase in the number of direct-call ports, which would reduce the volume of activity at the big trans-shipment ports accordingly.

163. A look at the prospects for change in the development strategies of the main active parties involved will help the countries concerned to gain a better grasp of these phenomena and thus to shape their own development policy more effectively.

2. Foreseeable development of the strategy of transoceanic shipping lines in relation to the practice of trans-shipment

164. Trans-shipment originated with the big transoceanic shipping lines and they remain to this day the driving force in the development of gridded networks and trans-shipment operations. Nowadays all the big lines operating on transoceanic routes are continuously re-evaluating their world-wide haulage strategy and revising their itineraries and ports of call as necessary and, of course, as dictated by the political and economic context of the moment and the associated demand for transport. A cut in the number of direct calls,

maritime trans-shipment and the desirability of a land bridge are always at the centre of the strategic thinking carried on by those in charge of operations. Their strategy is evolving along the lines indicated below.

(i) Intensified search for economies of scale

165. Lines are continually striving for competitiveness, resulting in a race for bigger and bigger vessels in order to minimize the unit cost per slot-mile. There is already talk of ships able to carry 5,000-6,000 containers. The same concern is observable on the secondary routes, where feeder size is steadily increasing; it has already passed the 1,000 TEU mark and could reach 2,000 TEU.

(ii) Increased combination ("massing") of trades

166. This is necessary in order to run ships at a profit. An increased concentration of traffic and activities on trunk lines and at megahub ports can be expected.

(iii) Systematic striving for optimum utilization of capacity

167. If massing the operator's own traffic is not enough, efforts are made to conclude agreements with other shipowners and to ensure more efficient massing of containers, facilitated by the gridded-network structure and by computerization. (The container pool of a big shipping line like CGM now costs half as much as the ships, or as much as the capital invested.)

(iv) Optimum timing

168. This involves elimination of idle and unproductive time and reduction of transit time between the main modal ports.

(v) Greater flexibility

169. To this end, efforts are made to achieve greater flexibility in the organization of a particular country's shipping services, resulting in an increase in the number and variety of feeder services and ports of call, and facilitated by the conclusion of agreements with other shipowners.

(vi) Faster computerization

170. Increased importance is being given to computerizing the management of the ship and container fleet (to maximize the use of the available investments and human resources) and commercial operations. This development is combined with simplification of procedures and the development of electronic data exchange.

(vii) Development of the commercial function

171. This involves formulation of a coherent trade and publicity policy on a world-wide scale to balance the integrated logistical services of customer multinationals, in particular by taking control of agents and using modern means of information and communication.

(viii) Increased integration of the market

172. This consists of gaining control of the engineering of the door-to-door service along with the supervision and management of overland pre- and post-haulage with some big shipping lines (APL, Sealand, Maersk, P & OCL, Hapag Lloyd, CGM and K Line) tending to take complete charge of physical distribution.

(ix) Search for economies of scope (mass made-to-measure services)

173. By extending their activities upstream and downstream of sea transport (see under "integration of the market"), shipping lines will with increasing frequency offer shippers more closely personalized services in order to gain their loyalty; examples are involvement in distribution logistics, computer links (electronic data exchange), and the Maersk Magic system which informs the shipper in real time of the location of his goods.

174. Incidentally, it should be pointed out that items (i)-(ix) above list the characteristics of current development in all the main service sectors: air transport, insurance, banking and finance, etc.

175. It would be impossible to gain all these advantages without port operations of tried and tested efficiency at the nodes of the network, which means that shipowners will be very demanding in the selection of trans-shipment ports.

176. Some will even go so far as to invest in ports in order to maintain full control over their trans-shipments; others will prefer to hold aloof and take full advantage of the competition between ports.

177. Some shipping lines, such as Sealand and Maersk, will prefer to do their own feederage; others in contrast, such as Dart Container line or Hapag Lloyd, will readily subcontract this operation to regional coasting firms subject to the express condition that the services should be sufficiently frequent.

178. Table 2 prepared by Mr. C. Abraham, the Chairman and Managing Director of CGM, summarizes the foreseeable evolution of shipowners' strategy.

Table 2

Maritime Carriers' Strategy

Characteristics and size of carrier	Flexibility, small size	Rigidity, medium size	Flexibility, large size
Markets	North-South concentrated	East-West, scattered	world-wide
Products	port-to-port	door-to-door, point-to-point	floor-to-floor
Land services	none	Merchant/carrier haulage	sea/land integration
Tariffs	non-conference	shipping conferences	non-conference, made-to-measure
Customers	forwarding agents	forwarding agents, shippers	shippers
Trade network	third-party agents	third-party and own agents	own agencies
Shipping alliances	none	consortia	consortia or none; separate marketing
Shipping network	shuttle	round-the-world	mesh
Ships	multi-purpose	2,000 TEU container ships	4,000 TEU container ships

3. The increased role of shippers and requirements associated with the development of trade

179. The big transoceanic shipping lines work directly for shippers, who are the linch-pins of foreign trade development.

180. The region-by-region survey above made it clear that most of the underlying factors in the development of gridded networks and trans-shipment operations can be traced back to the increasing pace of trade development. This is very clear in Asia in particular. This trade development is taking place in an environment of competition - sometimes very keen - which demands a search for greater productivity and competitiveness.

181. There is every indication that these trends will grow stronger. In many countries, vast industrial and service sectors will increasingly depend for their competitiveness, development and sometimes survival on their capacity to control their costs and on their flexibility: i.e. on "taut-flow" management

(operation without stocks) and the like. The induced demand for transport in general and for sea transport in particular is strengthened accordingly, for-given equal consumption (and there is no doubt that consumption will increase) - traders will push back the boundaries of the market in order to go, sometimes a great distance to buy (or sell) the products that offer the best quality-price ratio. On the other hand, the same factors mean that such trade-offs are not immutable; minor variations in the cost or quality of services may lead to changes in trade flows.

182. The result is that the induced demand for sea transport is markedly elastic to the cost and quality of services; it is consequently a volatile factor which makes it difficult to plan any investments in shipping or ports. The gradual emergence of gridded networks of maritime and multimodal transport, extending from the production site to the consumption point, has made it possible on some routes to offer the stability, reliability, speed and cost level that the market demands. For such integrated systems to yield their full potential, they need a favourable setting that enables them to achieve a high performance on every segment of every mesh, at sea, in port and on land.

183. We have already mentioned the case of developing countries where shippers export manufactures to highly competitive markets. They have opted for the solution offered by gridded networks built up on the principles of feeder service, trans-shipment ports and transoceanic lines, for it enables them to gain a few points on the cost, speed and frequency of services and the reliability and quality of carriage. Sometimes markets are won or lost on the improvement of only one of these items. Thus for "up-market" products a gain in transit time is sometimes the deciding factor; for "down-market" products, it will often be a reduction in cost. Pressure from the shippers has led several countries to revise their shipping policy, which was formerly designed to protect the national flag and corner some cargoes for it.

184. It is thus likely that, under the pressure of competition and in response to shippers' requirements, the two trends mentioned in the introduction to this chapter will run concurrently, some shipping lines aiming at a high concentration of activities in order to achieve the lowest costs while others opt for personalized services and the best transit time.

185. However, the shippers in developing countries whose geographical situation or small volume of trade places them on the fringe of or outside the gridded networks will often have no alternative to the continued use of conventional ports and shipping that carry little traffic and therefore incur high costs. They may, however, be expected to press for access to such networks, which offer them wider outlets world-wide and on all routes, South-North but also South-South.

4. The concerns of and foreseeable changes in national shipping companies

186. The fleets of many developing countries are keenly concerned about the development of trans-shipment operations, for it often involves them in a loss of traditional deep-sea traffic. Some countries, for example in Asia, have therefore made arrangements to reserve at least cabotage (feeder) operations for the national flag. Such measures are understandable but, as a rule, unfavourable to the development of a trans-shipment port in the country

concerned, for the big shipping lines prefer to call at ports where there are no such restrictions. It is found that such measures (which are also applied in some developed countries, particularly in Europe) have ultimately been abandoned, at least in one of the countries studied. The fact remains that a problem arises with regard to the role of the national shipping companies of certain developing countries which take an unfavourable view of being reduced to the operation of feeder services.

187. Voices have been raised in the developing countries to point out that the breakthroughs in the development of their shipping industry and as regards fair participation in the carriage by sea of their foreign trade, which have been achieved in the past 20 years and consolidated by the adoption of a number of national or international measures such as the Code of Conduct for liner Conferences, might be threatened by the current restructuring of world seaborne trade.

188. This study has yielded a number of lessons which may perhaps prove useful for developing countries in framing their maritime policy. First of all it is evident that the shippers make their voice heard more and more strongly and this often leads, in the shorter or longer run, to the reviewing of administrative or legal measures in as much as such measures penalize the goods and prevent them from taking the quickest and least expensive route. In formulating the corresponding policies, countries will have to consider the balance of interest between carriers and shippers, and ensure the provision of services adapted to the requirements of the country.

189. It is true that containerization and gridded networks cover only part of the market and that traditional shipping lines will always have a share of conventional cargo to carry. It would be desirable, however - sometimes in order to survive, sometimes because the interests of trade and of their country so require - that they should also participate in the development of container transport by network and should organize themselves accordingly.

190. To judge from the observations made in the various regions, there are three possibilities open to them:

- (i) To take part alone (though this is the exception) or through various forms of association, in the operation of main or parent routes;
- (ii) To associate with other local or international shipping lines in developing feeder services, or to develop feeder services by themselves. The size of feeder ships is increasing (1,000 TEU in Asia) and the role allotted to the shipowners concerned is thus far from negligible;
- (iii) To keep their international routes but modify them to include a call at a trans-shipment port at which, under agreements with big shipping lines, some of their cargo may be injected into the main flows of sea traffic.

191. Several years have passed since an African minister observed that, in view of those developments and the conclusion of co-operation agreements between developed countries, the shipowners of the developing countries should strengthen their own co-operation agreements in order to meet the same challenges, for they very rarely possessed the requisite investment and

management capacity on their own. This course seems more than ever essential in order to maintain and build on the gains achieved. In this area, diversification and a pragmatic approach are vital; agreements may be concluded with regional or international shipping lines according to the pattern of seagoing trade in the regions in question.

5. The development stakes and prospects open to port authorities

192. Becoming an important trans-shipment centre is a dream currently cherished by the managers of many ports who see their own traffic failing to grow at the hoped-for rate, where it is not stagnating or dwindling. Trans-shipment is regarded as a very attractive operation, for it involves much handling of containers and is accompanied, they think, by sizeable economic benefits. There is some truth in this reasoning, and some ports, including ports in developing countries, have in fact been able to gain an important position in this new market. On the other hand, many expensive investments have been made in order to attract a traffic which has not lived up fully to expectations, has entailed making sizeable tariff and other concessions, has not been accompanied by the expected economic benefits and has even, in some cases, vanished for external reasons totally unrelated to the quality of the services rendered.

193. Port authorities are often placed in the difficult situation of having to foresee a course of development over which they have little control. Nevertheless there is a veritable race taking place to install very costly trans-shipment facilities both in regions where trans-shipment has developed (Asia, the Persian Gulf, the Mediterranean and the Caribbean) and in regions which are preparing to introduce it, such as West Africa. Feasibility studies of trans-shipment ports are numerous and perhaps over-optimistic, for in many cases the proposed investments can be made to pay only by diverting trades which other ports also aspire to divert and are thus also taking into account in their own profit-and-loss calculations; the overall result is over-investment at the regional level.

194. Based as it is on differences of cost and distance, trans-shipment traffic, which depends for its existence and location on the decisions taken by shipowners in pursuit of what is often a world-wide transport policy, is a volatile traffic on which ports should be extremely cautious about founding their development for the economic viability of the vast investments required is often based on a wager which is reasonable only for one holding the assets that are essential to any hope of attracting and stabilizing a minimum of trans-shipment traffic or to adequate prospects for developing national container traffic.

195. These guarded comments should, however, be qualified and supplemented by more positive arguments, for another lesson of this study is that the choice of a trans-shipment hub is not made in advance by automatically applying compulsory criteria. There are, it is true, certain indispensable preconditions: geographical position, site quality, a dynamic trade policy, and first-class management and equipment. In addition, however, there are more varied qualifications which are accessible to a greater number and which may offset some weaknesses and make it possible to gain and retain an enviable position. The results achieved by Singapore, Colombo, Algeciras, Cyprus and Kingston among others point the way to follow.

196. It should also be pointed out that the will to gain trans-shipment-port status is a very positive feature, for it implies motivation, will to improve the management of port facilities and services, commercial drive, and willingness to make investment commitments: all these are assets that will improve the operation of the port even if the results in the sphere of trans-shipment activities do not come up to expectations.

197. Furthermore trans-shipment also means - and this is all too often forgotten or adversely construed - the emergence, or rather the reappearance on the scene, of small ports situated close to the places of production and consumption. These ports, it is true, will be feedered; but this situation in does not, in principle, affect their throughput in tons loaded or unloaded and may give them fresh vigour that sometimes enables them to make a decisive contribution to the development of their direct hinterland.

198. To facilitate the task of the many port authorities wishing to develop trans-shipment facilities, the sections which follow provide some general and technical information on the conditions required for, or favourable to, accession to the status of trans-shipment ports of the various kinds defined at the beginning of this study.

V. REQUIREMENTS FOR BECOMING A TRANS-SHIPMENT PORT

1. The requirements for becoming a hub port

199. Only the case of hub-load centre ports will be examined, since the "dedicated trans-shipment ports" are very rare and have the same requirements as the hub-load centres less those specific facilities and services necessary for the reception/delivery of inland traffic.

200. A potential hub port's ability to attract trans-shipment traffic will depend on a number of factors, including geographic location in relation to the main maritime routes, the magnitude and nature of the port facilities, and on the quality and cost of its performances. Potentially relevant aspects include the depth of water in approach channels and at berths (12 m seems to be a minimum) and an acceptable air draught at the berths (to receive the over Panamax vessels). Other factors will be the extent and availability of stacking areas, of container freight stations, and of cold stores and other specialized facilities, as required. In a hub port, the adequate availability of quay cranes and shore handling equipment will be an important requirement - and "availability" means effective availability, i.e. of equipment maintained in good working order.

201. There will also be need for the adequate multishift availability of labour (with night shifts and the port remaining open every day), and a good basis for labour relations is obviously a vital need. Apart from this, potential trans-shipment users will naturally be looking for quick operations, both in relation to vessels and to container movements. Efficient operations in large container terminals imply a requirement for efficient control and for the availability of management information services, and the availability of computerized information can be of value not only in relation to port and container terminal operations but also in a marketing sense as a service to users.

202. If trans-shipment activity is to be attracted successfully, it is of course important to secure the fullest possible co-operation between the Customs administration, port authorities and terminal operators and port users (shippers, shipowners), the purpose being to make as simple as possible the trans-shipment of cargo through a port, whether directly or with cargo storage for shorter or longer periods. Forms of organization appropriate to any country have to be devised and may include, for example, the development of a free port or free trade zone. A positive approach is to encourage potential users to develop areas within a port as centres for regional warehousing, where cargo can be stored until it is required and is shipped out.

203. If a port's trans-shipment potential is to be developed successfully, the necessary marketing work will have to be carried out. Port charges are an obvious subject of marketing importance. If ports are to attract trans-shipment, charges must be competitive and may be set at lower levels than on domestic traffic. In the port of Singapore, for example, stevedoring charges on trans-shipment are less than two thirds of the equivalent charges on domestic cargo. Where appropriate, as part of their marketing strategies ports may also wish to consider the leasing of berths as a way of encouraging major users to develop their trans-shipment activities there. Port marketing activities will in any case include co-operation with port users, whether

directly or indirectly. Such co-operation may involve the port carrying out marketing work to attract additional feeder services which, if attracted, would generate additional trans-shipment traffic. Everything is linked: the success of a hub port requires a high degree of services by the main shipping lines which in turn need a high degree of development of feeder services to ensure a high frequency of sailings to the feedered ports.

204. If ports are to attract trans-shipment business successfully, they will probably have to do so in competition with other ports, and competition is in fact affected not only by the facilities and services provided by the port, but also by the quality of the various facilities or services which may be available in or near to the port but which are provided by quite separate organizations. Such services may include the availability of efficient and helpful shipping agents and of competitive insurance, financial and maintenance services. Clearly, wherever relevant, the attractiveness of a port for trans-shipment traffic is enhanced by co-operation between the port authority and the various outside bodies concerned.

2. The requirements of direct-call ports

205. In relation to non-hub ports at which direct line haul services are also handled, the considerations relating to trans-shipment are perhaps less complex. Obviously, there is a need at such ports for sufficient port facilities to be available to accept relevant line haul vessels. There are similar requirements as at hub ports for helpful, positive relations with Customs and a similar need, for example, for a positive attitude towards marketing and port charges.

206. However, certain points may be stressed. It may be important to ensure that cabotage laws do not encourage trans-shipment through a foreign port, rather than through a national port, something which (as already noted) has happened, e.g. in South Asia. There may similarly be a need to ensure that regulations relating, for example, to road transport (and possibly formulated for reasons relating to national transport policy issues) do not cause movement through a foreign port by discouraging the use of a national port. In one multi-island country, a regulation setting domestic shipping freight rates at high levels has actually encouraged trans-shipment through foreign ports, as against through a national port (freight rates to foreign ports not being controlled). An instance is also known where, until recently, the differences in the way in which taxes were calculated favoured the import of traffic overland into the country concerned, instead of direct by sea into a national port, which in practice favoured the import of goods through a foreign port.

3. The requirements of feedered ports

207. As far as feedered ports are concerned, the primary need is to avoid over-investment in needlessly costly port facilities. In view of the costs of developing deep-water berths for example, it is necessary to make a realistic assessment (in the light of relevant government policies affecting shipping) of the demand for such berths, as against facilities of more appropriate size.

208. If in fact it does seem probable that a port will be served by feeder vessels, then this may affect not only the depth of water provided but also, for example, working and storage land area requirements. Furthermore, if feeder rather than line haul vessels are to be used to service a port, another question arises, as to whether it is necessary to provide shore-based cranes. The Bangkok experience is very interesting in this context. In 1986, the port satisfactorily handled over 500,000 TEU, largely using ship's gear. For a period, it became compulsory to use shore-based equipment, but now vessels have again become free to use their own gear, if they so desire.

209. In the Caribbean area, small ports with very limited facilities are now receiving small Ro Ro feeder vessels which can unload and load their trailers in a few hours and go to another island.

210. The investments needed obviously depend on the size and type of feeder vessels in activity in the region.

4. Preliminary guidelines for the preparation of feasibility studies on the establishment of transshipment facilities

211. One of the greatest difficulties faced by port authorities wishing to establish trans-shipment facilities is in obtaining technical and economic information from which to prepare feasibility studies of good quality that will tell them what installations and equipment would be economically and technically justified by the prospects for traffic development.

212. UNCTAD has already issued documents explaining the methodology to be applied in any feasibility study of port investment in order to compare the cost with the expected advantages using updating techniques to eliminate the effect of the spread of these items over time: "Port development" (TD/B/C.4/175/Rev.1) and "Appraisal of port investments" (TD/B/C.4/174).

213. The application of this methodology presents no special difficulties attributable to the nature of trans-shipment operations except those met with in preparing estimates of the type of traffic which the development is expected to attract and which will combine with the country's or region's own traffic to form the port's future container traffic. It must be admitted that, except in a few cases, trans-shipment traffic will be no more than a make-up and will not in itself be sufficient to justify the high cost (often \$30-60 million or more) of a container terminal.

214. The region-by-region survey and the general considerations put forward in this study should enable port authorities to gain a good understanding of the trans-shipment phenomenon and give them a first glimpse of the prospects for its development in the region concerned. Contacts with shipping lines, careful study of specialized publications (such as Containerisation International Yearbook) and the advice of experienced consultants will make it possible to prepare preliminary traffic forecasts. No exact figure can be given for the minimum break-even point at which a port can progress from the status of a direct-call port at which trans-shipment is the exception to the status of a trans-shipment and loading centre. In some regions, such as the Caribbean, the figure of 30,000 TEU per annum has been put forward. Elsewhere the situation will be different. In any case these classifications are arbitrary.

215. Every scatter trade it is hoped to attract will have its own requirements: draught; length of quays; turning circles; characteristics of gantry cranes and of yards; equipment; berthing priority; hours of work; tariffs; etc., etc. It will happen over and over again that the hopes placed in the development of trans-shipment cannot be brought to fruition because the cost too greatly exceeds the advantages. The plans must then be revised. Some ports will quickly grasp that their future lies rather in receiving feeder ships, and will equip and organize themselves accordingly.

216. To facilitate the preparation of such studies, the main characteristics of some significant trans-shipment ports and the equipment they use are shown in annex II. Ports handling different kinds of traffic have intentionally been chosen so as to enable everyone to make the necessary comparisons in the light of his own traffic. In addition the characteristics and number of yard gantries (on tyres or on rail) have intentionally been included.

217. Annex I gives fuller technical details on the four generations of container ships and on the port facilities and equipment designed to receive them. The reader's attention is drawn to the amount of technical information given in that document.

218. It should be emphasized that, in this particular field of choice of investments, it is highly desirable to adopt a port planning policy that can be adjusted according to the extent to which the initial assumptions prove correct. The strategic planning formula, 29/ which incorporates scope for reacting and for modifying or adjusting the initial plans in the light of events, seems particularly well suited to the needs of ports in this period of drastic change in the organization and pattern of sea transport.

219. Lastly, it should be noted that the options chosen with regard to terminal organization and operation must be such as will meet traffic requirements; this means discarding out-of-date flow charts for the operation of break-bulk cargo quays, where improvisation, approximation and versatility are tolerated, in favour of well-defined systems designed for strict application by highly skilled personnel.

220. It has not been possible within the limits of this study to consider in more detail the technical and economic characteristics of the construction, equipment and operation of container terminals assigned to trans-shipment operations. A supplementary study could be prepared if necessary.

Notes

1/ International Maritime Dictionary, by René de Kerchove. Second edition, D. Van Nostrand Company Inc., Princeton, New Jersey.

2/ According to a study carried out by Laurence Prust/Alex Brown & Sons Inc., the cost per container-mile is \$0.108 for a European 1,500 TEU container ship and \$0.06 for an American 4,258 TEU container ship. Filling rate: 70 per cent.

3/ Econometric calculations of trans-shipment operations will be found in the first UNCTAD study on this subject: TD/B/C.4/293, entitled "Trans-shipment ports".

4/ In a previous study (UNCTAD/ST/SHIP/12 of December 1987) the UNCTAD secretariat estimated the cost of the confirmed container terminal projects in developing countries at \$5,600 million. Forty-four new projects were under consideration at that time.

5/ Except where otherwise indicated, the port traffic statistics are drawn from the Containerisation International Yearbook, 1988 and 1990. This publication contains a great deal more very useful information.

6/ According to Containerisation International Yearbook 1990, the leading containerized ports are Hong Kong (4,033,427 million TEU in 1988), Singapore (3,375,100), Rotterdam (3,288,829), Kaohsiung, Taiwan, Province of China (3,082,838), Kobe, Japan (2,232,911), Busan, Republic of Korea (2,205,532), New York/New Jersey (2,095,530), Keelung, Taiwan, Province of China (1,761,695), Los Angeles (1,652,070), Hamburg (1,621,615).

7/ Lloyds Maritime Asia, October 1989.

8/ Source: Port of Singapore.

9/ Lloyd's Maritime Asia, October 1989.

10/ According to a study carried out by Ocean Shipping Consultant, the annual productivity of a gantry crane in the Republic of Korea, Taiwan Province of China, etc., is around 130,000 TEU, as against 50/60,000 TEU in many developed countries (Europe, Japan, United States, etc.).

11/ Lloyd's list, 5 February 1990.

12/ Lloyds Anversois, 3 March 1990.

13/ Lloyds Anversois, 12/13 June 1989.

14/ Lloyds Anversois, 11 April 1990.

15/ Containerisation International Yearbook, 1988-1990.

16/ MTEU = millions of twenty-foot equivalent units.

17/ Lloyds List, 20 April 1990, Seatrade Week, 20-26 April 1990, Fairplay, 19 April 1990.

18/ Port Development International, December 1988.

19/ Containerisation International Yearbook 1990s.

20/ See the UNCTAD study "Port Administration and Organization: a noteworthy experiment in Morocco" (UNCTAD/SHIP/627).

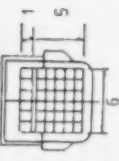
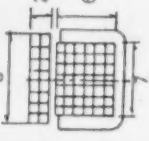
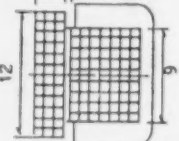
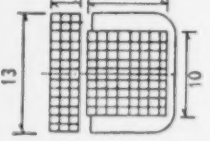
21/ Port Development International, May 1990.

22/ Source: Port of Abidjan.

23/ Source: Port of Dakar.

- 24/ Containerisation International, February 1989.
- 25/ Journal de la Marine Marchande, 27 April 1990.
- 26/ Source: Journal de la Marine Marchande, 13 April 1990.
- 27/ Source: Kenya Ports Authority.
- 28/ Source: Journal pour le transport interntional, 2 January 1990.
- 29/ See Strategic Planning of National Port Systems, by
Dr. Anatoly Hochstein, Joint Port and Waterway Institute, Louisiana State
University, George Washington State University.

Annex I Progression of Containerization

Chronology	First Generation	Second Generation	Third Generation	Fourth Generation
Age of domestic coastal services before 1966	Age of short international service across one ocean since 1966	Age of long international services through plural oceans since 1971	Age of round-the-world services since 1984	
Examples of services	Coastal services in U.S.A. and Australia	Trans-Atlantic and trans-Pacific services	Services between Europe and Far East, and U.S. West Coast and Europe	Round-the-world services
Areas containerized	U.S.A., Australia	Developed countries such as U.S.A., Europe, Australia, Japan, etc.	Developing countries in South-East Asia, Middle East, South America, etc.	World wide including China, India, and countries in Africa
Containers	Pre-ISO standard size . . . 17'24", 35' long	ISO standard size . . . 8'6" x 8'20"/40'	High cube type . . . 9' x 9'6" high	Deviation from ISO standard sizes . . . 45', 48' long
Container-ships	Mainly converted ships with on-board cranes "Gateway City" 135.7mx22mx7.7m 7,785 DWT on-board crane "Hawaiian Citizen" 141.8mx21.3mx9m 10,282 DWT	Purpose-built ships of 700-1,500 TEU capacity "America Maru" 175mx25mx9.5m 15,440 DWT "Hakozaki Maru" 200mx30mx9.5m 19,914 DWT	Purpose-built ships over 2,000 TEU capacity (Panamax size) "Kurobe Maru" 242mx32.2mx11.5m 32,343 DWT "Frankfurt Express" 271mx32.2mx13.0m 51,540 DWT	Purpose-built ships over 3,000 TEU capacity "Atlantic" Class 279mx32.2mx10.7m 57,800 DWT "C-10" Class (Post-Panamax size) 261mx39.4mx11m 41,250 DWT
				
Quay-side container cranes	Alameda, Maison Terminal Rated capacity 25.4t, 30m/min(hoist) x 125m/min(traverse) Total weight 350t, 27.85m(outreach) x 10.37m(span) x 15.63m(clear lift)	Kobe, Maya-Pier 23.4t, 30x130 464t, 31.5x16x19.5 600t, 32x30x21	Yokohama, Hommoku 30.5t, 36x160 640t, 36.1x30x27 Telescopic spreader	Yokohama, Hommoku 30.5t, 40x152 850t, 37.3x25.3x29 Telescopic spreader
Container terminals	Straddle carriers, Clark 525, 1 over 1, 165 PS (34') Transfer cranes (3 cont. lanes + 1 traffic lane) x 1 over 2 Large forklift trucks, Yard use tractors	Mitsubishi Vsc20, 1 over 1, 180 PS (20') Mitsubishi Vsc40, 2 stacking, 190 PS (40') (6 + 1) x 1 over 3 Top-lift trucks, Side loaders	Mitsubishi Vsc203 (20') 1 over 2 (40') 2 stacking, 180 PS Mitsubishi Vsc4023, 1 over 2, 200 PS (20'/40') (6 + 1) x 1 over 4 (semi-automatic) Front end loader	Mitsubishi Vsc4434, 1 over 3, 2 x 170PS Nelson 904, 4 stacking, 2x180 PS(20'/40') (7 + 1) x 1 over 4, (6 + 1) x 1 over 6 Multi-trailer systems
Remarks		Computerized	Computerized, Semi-automatic operation Feeder service networks land-bridge operation	Computerized, Advanced automatic operation NVOCC Integrated service of surface with air transport

Source: Extracted from a paper *Containerization enters the fourth generation* by Itsuro Watanabe, Mitsubishi Heavy Industries Ltd., Japan and published in "Ports and Harbours", June 1985.
The table was updated in April 1990 by the author for UNCTAD.

Annex II

MAIN CHARACTERISTICS OF SELECTED TRANSHIPMENT AND CONTAINERIZED PORTS

PORT terminals	Total TEU : handled	To : tal	Berths : area	ganh : N	De : gch	Shore : pth	gantries : (m)	Sto : Yard gantries : (No x tons)	Sto : on tyres (w) : (TEU) : on rail (r)	Straddle : Reefer : carriers : points : a syst
LARNACA (Cyprus)	99,482	15	-	666	10	-	-	1,700	-	25 + +
LIMASSOL (Cyprus)	187,867	22.6	-	1,280	11	2 x 40t	-	4,700	6 x 30t	78 + +
MARSEILLES (France)	390,683									
FOS Cont. Terminal	-	33	5	1,130	14	6 x 40t	-	-	-	112 - +
Brule-Tabac Quay	-	165	4	870	10.8-11	1 x 40t	-	-	-	- + -
Mourepiane Terminal	-	10.5	3	530	11.7	2 x 40t	2,500	1r x	-	68 + +
PIRAEUS (Greece)	331,860									
Main Port/St George	-	9	8	-	12.5	3 x 40t	-	-	20 x 30t	- + +
Venizelos Terminal	-	7	-	1,200	14	2 x 46t	-	-	-	- -
GENOA (Italy)	326,710									
Terminal 1	-	37	5	1,200	11-11.5	6 x 45t	15,000	6rdw x 40t	-	- - +
Terminal 2	-	16.5	2	520	14	4 x 45t	-	6rlw x 40t	-	- - +
ALGECIRAS (Spain)	412,000									
Muelle Isla Verde	225,573	20.6		700	12	4 x 30t	-	-	-	120 + -
Muelle del Navio	171,600	7	1	270	14	3 x 40t	6,300	6w x 32t	-	288 + +
Terminales de Algeciras	-	14	1	270	14	2 x 40t	1,500	-	-	100 + +
VALENCIA (Spain)	342,736									
Container Terminal	221,451	35		850	14	5 x 30t	10,000	9w x 32.5t	-	200 + +
MIAMI (USA)	207,109	242.9	3,030	7.6-11.6	6 x 40-50t	-	22,500	-	-	200 + +
PUERTO CORTES (Honduras)	124,308									
Container Terminal		6.2	2	352	10.6	1 x 45t	2,800	-	4 x 30t	60 - +
CRISTOBAL (Panama)	82,448									
Container Terminal		7.5	2	428	10.7-12.2	2 x	3,000	-	-	40 + -
HAJNA (Dominican Rep.)	110,665*									
Container Terminal	39,897*	-	1	200	-	1 x 30t	1,400	-	-	85 + +
KINGSTON (Jamaica)	111,669									
Container Terminal		24.3	4	640	10.4-11.9	4 x 40t	6,000	9 x 30t	14 x 30-40t	72 + +
POINTE-A-PITRE (Guadeloupe)	74,559	25	2	400	11	3 x 40t	3,000	-	-	48 + +
PONCE (Puerto Rico)	38,309									
Berth 8		8.5	1	180	10.4	1 x 40t	-	-	-	80 - +

DAR-ES-SALAAM (Tanzania) Container Terminal	61,946	10	2	560	-	2 x 35.5t	3,500	1r5w x	-	-	+	+
ALEXANDRIA (Egypt) Container Terminal	154,495 125,758	16	1	550	14	3 x 32-40t	6,000	4w x 32t	-	390	+	+
CASABLANCA (Morocco)	79,666*	14	-	450	8	-	5,000	-	10 x 30t	-	+	-
DOUALA (Cameroon)	84,239	25	2	400	11.5	-	7,900	-	-	90	+	+
LAS PALMAS (Canary Islands)	135,769*	21.7	-	960	12-14	2 x 35t	-	-	-	96	+	-
ABIDJAN (Côte d'Ivoire)	178,973*	2.1	1	-	12.5	2 x 40t	6,000	-	-	4	-	-
LAGOS (Nigeria) 3rd Apapa Wharf Extn	155,508 -	50.8	-	1,600	11.5	2 x 35t	10,000	1r6w x 35-37t	7 x	-	+	-

Source: Containerisation International Yearbook, 1990.

Note: CFS = container freight station.